



EDS futurist Jeff Wacker prepares for the coming data flood with context-sensitive text-mining tools. **PAGE 42**



TRW Automotive's Joe Drouin and other CIOs trade tips on aligning IT with business needs. **PAGE 5**

# COMPUTERWORLD

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OCTOBER 25, 2004 • VOL. 38 • NO. 43 • \$5/COPY

## Microsoft Takes Different Tack on Multicore Pricing

Software licensing plan is at odds with IBM, Oracle schemes

BY CAROL SLIWA

Preparing for the wave of servers with multicore processors that's expected to hit data centers over the next year, Microsoft Corp. last week said it won't require users of its database and other server software to buy licenses for each processor core.

All the server software that Microsoft currently licenses on a per-processor basis will

continue to be licensed based on the number of chips in a system. That puts Microsoft at odds with competitors such as Oracle Corp. and IBM, which have said they plan to treat each processor core as a separate CPU for software licensing purposes.

For instance, SQL Server users will be able to license the Microsoft database at the same price, whether it

runs on a server with conventional processors or one with dual-core CPUs that put two processing engines on a single

*Multicore, page 70*

### INSIDE

SQL Server 2005 may slip for a fourth time. **PAGE 70**

## iSeries Users Doubt IBM's Commitment

Call on vendor to market better, expand its customer base

BY PATRICK THIBODEAU  
TORONTO

Year after year, IBM iSeries users have complained that the company isn't doing enough to market that line of midrange

systems and expand its user base. And indeed, it didn't seem to matter to many of the attendees at a conference here last week that IBM had just announced its most powerful iSeries machine ever, with up to 64 processors.

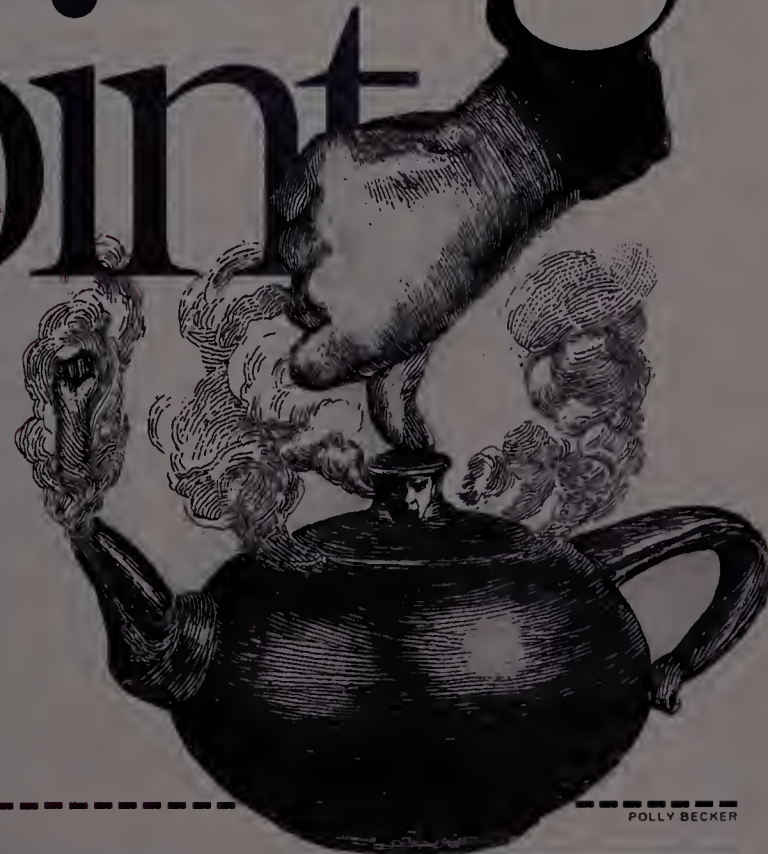
Doubts about the future of the iSeries, formerly known as the AS/400, remain among the IT managers who gathered for the fall conference held by Common, a Chicago-based user group.

As attendee Dan Swinehart, project development manager *iSeries, page 14*

# Boiling Point

NEARING THE

## COMPUTERWORLD SALARY SURVEY 2004



POLLY BECKER

### ONLINE EXCLUSIVE

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Use our Smart Salary tool to compare your pay against results from this year's IT salary survey:



Puny pay raises were the norm for most IT workers for the third straight year. Our survey of nearly 10,000 IT professionals also shows

that budget cuts and increased workloads are driving stress to an all-time high. Package begins on page 49.

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— CIO/vice president of IT —

**\$82,851** +2.4%

— IT manager —

**\$71,900** +3.8%

— Help desk/tech support manager —

**\$41,757** -1.5%

— Technician —

NOTE: DOLLAR AMOUNTS ARE AVERAGE TOTAL COMPENSATION. PERCENTAGES ARE AVERAGES COMPARED WITH 2003 CALCULATED FIGURES.



Q. HORATII FLACCI

[5]

velet carum caput: extrahe turba

uentem nullo te audere. Sea me  
trahit Proserpina: vive valeque.

SATIRA VI.

HORATII VOTUM.

a votis: modus agri non ita magnus,  
et tecto vicinus jugis aquæ fons,  
silvæ super his foret. Auctius atque  
ecere: bene est: nil amplius oro,  
nisi ut propria hæc mihi munera faxis.  
majorem feci ratione mala rem,  
acturus vitio culpave minorem;  
stultus nihil horum, *O si angulus ille*  
*accedat, qui nunc denormat agellum!*  
*n argenti fors quæ mihi monstret, ut illi,*  
*nvento qui mercenarius agrum*  
*m mercatus aravit, dives amiso.*  
Si, quod adest, gratum juvat, hac prece te oro,

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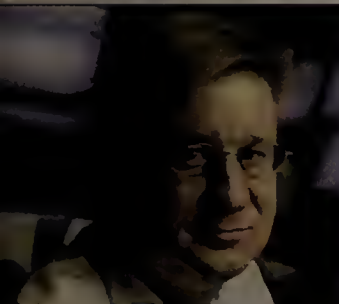
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# Driver's Seat



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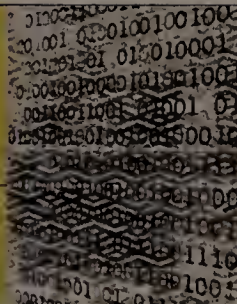
## Exchange Makes Linux Call

**In the Technology section:** Joseph Panfil is part of a team moving the Chicago Mercantile Exchange from proprietary Unix and RISC-based systems to Intel-based servers running Linux in a bid to cut IT costs. **Page 31**

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## Checkpoint for Check 21

**Also in the Technology section:** The federal law paving the way for electronic image exchange of checks goes into effect this week, but banks still have a long way to go before the technology is in place to make it work. **Page 34**

## NEWS

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- 4 **Symbol Technologies** rolls out a handheld device that weighs and costs less than its ruggedized models.
- 5 **Getting IT to align** with business units is a top priority in this harsh economic climate, say CIOs at the Gartner Symposium/ITxpo conference.
- 5 **J. Sainsbury and Accenture** renegotiate their outsourcing deal so the grocery chain can gain more control over its IT operations.
- 6 **ILM and virtualization** products get their day in the sun at this week's Storage Networking World conference in Orlando.
- 6 **Hackers crack** a database that housed personal data on more than 1.4 million Californians.
- 8 **Tech salaries will rise** 10% to 15% through 2007 for workers with certain skills, Meta says.
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- 10 **Lack of internal integration** hinders corporate security efforts, a new report says.
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### COMPUTERWORLD SALARY SURVEY 2004

**Nearing the Boiling Point.** For the third year in a row, IT workers across the board received only modest pay raises; salaries rose an average of 3% in 2004. Budget cuts and increased workloads are also driving stress to an all-time high. **PAGE 49**

**Charts and Data Points.** Find salary information for 30 IT job titles, plus much more. **PAGE 54**

#### ONLINE EXCLUSIVES

**Interactive Smart Salary Tool:** Compare your pay against salary data from nearly 10,000 IT workers.

**PowerPoint Downloads:** Find more statistics from the 2004 salary survey, including data from more than 500 consultants and contractors.

## OPINIONS

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- 25 **David Moschella** recalls that IT issues were more prominent during the 2000 presidential race than they are in this year's campaign. But he's confident that public perceptions of the industry will rise again in the years ahead.
- 46 **Daniel J. Weitzner** suggests that although it may seem paradoxical, transparency about how personal information is collected and used is a key step in privacy protection.
- 72 **Frankly Speaking: Frank Hayes** warns that as Halloween approaches, you ought to beware of the monsters that lurk among corporate IT — especially your Frankenstein systems and Jekyll and Hyde managers.

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## ONLINE

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### Storage Networking World

**STORAGE:** Head to our Knowledge Center this week for full coverage of Fall Storage Networking World, which runs through Thursday in Orlando. **QuickLink k1700**

### What Your CEO Thinks About Security – and How to Change It

**IT MANAGEMENT:** Columnist Larry Ponemon offers tips on how to get your company's leadership to better value security, based on a survey of chief executives. **QuickLink 50104**

### Five Log-Analysis Mistakes

**SECURITY:** Anton Chuvakin of NetForensics outlines common pitfalls and offers suggestions on how to deal with them. **QuickLink 49539**

### Putting SRM to Best Use

**STORAGE:** Read some tips that can help you make the most of your storage resource management tools. **QuickLink 50174**

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- Knowledge Centers **QuickLink a2570**
- The Online Store **QuickLink a2420**



## AT DEADLINE

### Avis Europe Scraps PeopleSoft System

Avis Europe PLC said it has scrapped development of an ERP system based on PeopleSoft Inc.'s applications because of cost overruns and delays. The Bracknell, England-based car rental company said it ran into "a number of fundamental problems with [the] design and implementation" of the ERP system. PeopleSoft said Avis Europe licensed its software in early 2003, but it declined to comment about the project's cancellation. Avis Europe also said it plans to substantially reduce the scope of a wider IT restructuring initiative, including planned outsourcing moves.

### Visual Studio to Get Added Design Tools

Microsoft Corp. tomorrow will announce a framework and a tool for building customized "visual designers" that can be used to develop applications tailored for vertical industries. The framework and tool are based on the modeling technology in Microsoft's upcoming Visual Studio 2005 release and are extensions to the Team System edition of Visual Studio. Microsoft plans to release a Community Technical Preview of the technology this week.

### Short Takes

IBM said it has signed a seven-year, \$180 million business and IT outsourcing deal with Dun & Bradstreet Corp. The contract involves portions of D&B's data acquisition and delivery, customer service and financial operations. About 220 employees will be shifted from the Short Hills, N.J.-based company to IBM. . . . **FRANCISCO PARTNERS**, a Menlo Park, Calif.-based investment firm, said it will buy IBM's electronic data interchange and business-to-business network services units and merge them with its Global Exchange Services Inc. unit, which is based in Gaithersburg, Md. The purchase price wasn't disclosed.

# Analytics Tools Aim to Improve on Spreadsheets

## SAS, Oracle and Siebel tackle financial analysis

BY HEATHER HAVENSTEIN

**C**OMPANIES still relying on spreadsheets and other piecemeal financial planning and budgeting methods are the targets of a trio of new packages designed to provide an enterprise view of financial performance.

SAS Institute Inc., Oracle Corp. and Siebel Systems Inc. have each brought out tools aimed at tightening financial reporting operations.

SAS this week rolled out its SAS Financial Intelligence line, which the Cary, N.C.-based company said can help organizations get more accurate and timely financial results for use in the reports needed for regulatory compliance efforts and corporate management.

MCI Inc. is using the activity-based management product

in the SAS line to replace spreadsheets and better link operating expenses to individual products by segment, said Leslie Mote, corporate business analysis director at MCI. The new system provides more cost and salary data on MCI product lines than previous tools, Mote said. "I don't think the executives were able to see that from a high level" in the past, she said.

Now, employees from different units can see how their actions relate to other parts of the company regarding cost and profitability, Mote said. In addition, MCI uses the tool to segment salary data for reports to the Securities and Exchange Commission and to help better set pricing schedules.

The Thomson Corp., a Stamford, Conn.-based provider of customized information systems to various industries, used the earlier version of the SAS software to meet the SEC's reporting requirements for listing on the New York Stock Exchange, said David Ross, Thomson's direc-

**"We needed something to be able to support a standard, repeatable, consolidated process every single month."**

.....  
**DAVID ROSS**, DIRECTOR OF CORPORATE FINANCIAL SYSTEMS, THOMSON CORP.

tor of corporate financial systems. "We really didn't have one version of the truth, [and] we needed something to be able to support a standard, repeatable, consolidated process every single month," Ross said. Some of the newer SAS features — such as real-time consolidation — may help Thomson close its books and report earnings more quickly, he added.

Oracle this month began shipping its Enterprise Planning and Budgeting application, which is designed to integrate planning and budgeting

processes in a single database and associate financial data with specific users who can be held accountable for changes, said John Schoenherr, Oracle's vice president of corporate performance management development. The new application will replace Oracle Financial Analyzer and Oracle Sales Analyzer.

For its part, San Mateo, Calif.-based Siebel this month brought out Financial Analytics, which the vendor said can deliver real-time visibility into financial data and provide an early warning of deviations from plans.

The three vendors are positioning their products for companies struggling with spreadsheet budgeting, said Wayne Eckerson, an analyst at The Data Warehousing Institute in Seattle. "The budgeting/planning system is integrated with financial consolidation and accounting systems so standards are baked in the operational side of financial reporting," he said. "The numbers are more accurate and up to date." **50255**

## BEYOND SPREADSHEETS

Spreadsheets are ubiquitous, but they may be a liability in the Sarbanes-Oxley era:

**QuickLink 46772**  
www.computerworld.com

## Symbol Scales Down Weight, Cost of New Handheld Model

BY MATT HAMBLIN

Symbol Technologies Inc. last week announced the MC50 handheld computer, a device that's designed to be more durable than conventional handhelds and is priced in between those products and fully ruggedized models.

The MC50 is aimed at salespeople and other mobile workers, as well as roaming employees such as retail sales-floor managers and IT staffers who oversee data centers or server farms, said Symbol product manager Doug Lloyd.

The device weighs about 7 oz., making it much lighter than rugged handhelds like

the 26-oz. MG9000-G model offered by Holtsville, N.Y.-based Symbol. But Lloyd said the MC50 includes some durability features that should help extend its life and enable IT managers to plan longer replacement cycles than they can with most handhelds.

For example, the keys on the MC50 can be depressed many more times than the ones on typical handhelds can, Lloyd claimed. He said the device also includes special covers designed to protect its ports from dust and sudden impacts.

The MC50 is equipped with integrated Wi-Fi technology and data-capture options that include a camera as well as one- and two-dimensional bar code scanning capabilities. In addition, it supports voice-over-IP applications, Symbol said. Shipments are due to start in December, with prices ranging from \$925 to \$1,200.

That price range puts the MC50 between low-cost handhelds selling for about \$200 and the most expensive ruggedized devices, which can

cost more than \$1,500 and are aimed at users such as package-delivery drivers, said Jack Gold, an analyst at Meta Group Inc.

Gold and Gartner Inc. analyst Ken Dulaney both noted that the

MC50 doesn't include a wireless WAN connection. Dulaney predicted that the device will be used primarily as a low-cost inventory management and control terminal in WLAN installations.

The MC50 comes in two versions, one with a standard keyboard and one with a navigation bar. Symbol said it runs on the Windows Mobile 2003 Second Edition operating system and is compatible with customer relationship management software from vendors like Microsoft Corp., Oracle Corp., SAP AG and Siebel Systems Inc. **50231**

## WIRELESS CRM RETURNS

PeopleSoft plans to put CRM software on BlackBerry handheld devices:

**QuickLink 50230**  
www.computerworld.com



Symbol's MC50



# Bad Times Boost Efforts to Align IT, Business Goals

CIOs bridge gap by recruiting business managers to oversee efforts

BY HEATHER HAVENSTEIN  
ORLANDO

While corporations have aspired for years to more closely align IT investments with core business goals, the current harsh economic climate has prompted many enterprises to formalize such ties, according to a panel of CIOs speaking here last week at the Gartner Symposium/ITxpo. And panelists said those efforts are beginning to reap concrete results.

For example, the Washington-based AARP (the American Association of Retired Persons) has a department within IT made up of business

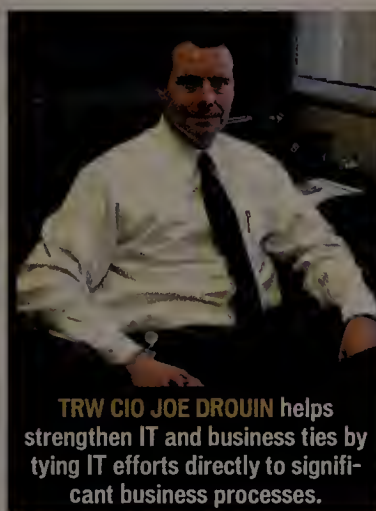
analysts and project managers recruited from outside IT that's dedicated to aligning technology efforts with the needs of the business, said CIO John Sullivan.

"Those are the most popular people in our organization," Sullivan said.

After working with that business-IT alignment group for a few years, the employees are warmly welcomed back by their previous departments, which are eager to mine their knowledge of IT, he added.

Closer ties between business and IT helped the AARP slash the timetable of a planning and approval cycle for upgrades to its call center systems from the normal six to 18 months to less than three days, Sullivan said.

At TRW Automotive Holdings Corp., a Livonia, Mich.-based automotive supplier,



TRW CIO JOE DROUIN helps strengthen IT and business ties by tying IT efforts directly to significant business processes.

CIO Joe Drouin nurtures the ties between IT and the business by mapping IT efforts to correspond directly with significant business processes — such as order fulfillment. Drouin has also recruited an IT business manager from TRW's finance department.

The efforts are yielding tangible results at TRW, Drouin

said. In a recent presentation to the chief operating officer on the merits of antivirus technology, an IT manager focused on the risks the company's operations would be exposed to if its systems weren't protected. The COO agreed on the spot to dedicate additional resources to secure systems, he said.

## Lines Are Blurring

"The lines are starting to blur a bit — is this guy an IS guy or a business guy?" Drouin said of company perceptions of IT managers who work on projects that bolster business goals. "Other parts of the business are hungry for these people who are solving these problems," he added.

At the Government Accountability Office, an agency that works for Congress to scrutinize how the federal government spends money, CIO Tony Cicco uses business managers — rather than IT staffers — to make presentations about the effectiveness of specific IT programs.

"When a business manager

gets up and shows how he has been much more of a success ... we get a lot of recognition," Cicco said.

The GAO's IT department also regularly gauges the satisfaction of its users with customer satisfaction surveys, Cicco added.

Charles Iacovuo, a professor of IT at Wake Forest University's Babcock Graduate School of Management in Winston-Salem, N.C., said in an interview that most companies need to do more to institutionalize the effort to bridge the gap between business and IT.

Organizations can use scorecards and service-level agreements to monitor how IT is performing against established goals and designate account managers to interact with business units, he said.

And formalizing these ties can become easier as more CIOs begin to report not to departmental executives but to C-level executives, Iacovuo added. "That forces the other business executives to accept them as a partner," he said.

50225

# Sainsbury, Accenture to Redo Outsourcing Pact

Grocery chain seeks to regain control over IT

BY LAURA ROHDE  
LONDON

Looking to gain more control of IT operations, J. Sainsbury PLC, the U.K.'s second-largest grocery chain, is in the process of renegotiating a \$3.25 billion outsourcing contract with IT services provider Accenture Ltd. as part of an overall three-year, \$4.54 billion rescue plan designed to reinvigorate the struggling business.

In an attempt to drive down the price of the Accenture contract, Sainsbury will simplify existing IT systems as well as those in the pipeline, because the implementation effort has "failed to deliver the anticipated increase in productivity," while IT costs continue to eat up more and more

of the company's overall budget in proportion to sales, Sainsbury said in a statement.

London-based Sainsbury signed a seven-year deal with Accenture in 2000 to outsource all of its IT operations. The pact led to the transfer of about 800 Sainsbury employees to Accenture. The grocer retained a small in-house staff to oversee the new IT strategy.

Last November, the contract was renegotiated with an eye toward cutting costs and extended through 2010, a Sainsbury spokeswoman said.

## In-house Focus

In the statement, the supermarket chain said it wants to renegotiate the contract in an effort to provide its personnel with more input into the selection and implementation of IT systems. Sainsbury is also looking to rebuild its internal IT staff and systems.

One of Sainsbury's biggest IT problem areas is the operation of its four new automated depots, which the company said are failing to perform at the planned levels.

Accenture, which is one of the world's largest providers of IT services, said that although it's responsible for the supermarket chain's IT trans-

formation program, including some of the supply chain systems, the automated depots were never part of its contract with Sainsbury.

Accenture said it replaced the bulk of Sainsbury's core operational systems, providing "improved reliability and stability of systems" while also reducing the grocery chain's



SAINSBURY says getting better performance out of its four automated depots is part of the grocery store's IT transformation effort.

annual IT operating costs.

Because negotiations between Sainsbury and Accenture are currently taking place, representatives from both companies declined to comment beyond the statements.

Sainsbury said that in its 2004-2005 fiscal year, it will write off \$254 million of redundant IT assets and \$218 million in automated equipment in the new fulfillment depots. An additional \$54.5 million in inventory losses resulting from the disruption caused by the new depots and IT systems will also be written off, the company said.

Sainsbury estimates that its expenditures in its IT systems and supply chain will come in at an additional \$363.5 million over the next two years. The company projects IT budget savings of \$72.7 million by its 2007-2008 fiscal year. 50212

Rohde writes for the IDG News Service.



## BRIEFS

## PeopleSoft Will Pay Former CEO \$3.2M

PeopleSoft Inc. disclosed that it will pay former CEO Craig Conway a severance package of at least \$3.2 million to cover the salary and bonuses he could have earned over the next two years. PeopleSoft's board ousted Conway on Oct. 1 [QuickLink 49819]. But in a regulatory filing dated last Monday, the company said Conway was fired without cause, making him eligible for continued salary payments and accelerated vesting of his stock options.

## Wording Revised on Takeover Defense

In another matter, PeopleSoft said it has revised the contract language for the so-called customer assurance program that the software vendor adopted as part of its effort to fend off Oracle Corp.'s hostile takeover bid. The changes were made to clarify some of the provisions of the program, which could trigger payments to users if PeopleSoft is acquired. Oracle has asked a judge in Delaware to invalidate the payment offer.

## AMD Adds High-End Desktop Processors

Advanced Micro Devices Inc. announced a pair of high-end processors for desktop PCs to compete against Intel Corp.'s Pentium 4 line. AMD said it's adding the Athlon 64 FX-55 chip for high-performance applications and the Athlon 64 4000+, which is positioned as a mainstream offering.

## Intel Eyes Optical Links for Systems

An Intel executive told the IDG News Service that the company is developing an optical interconnect to replace the copper-based links now used in laptop PCs and servers. The technology should be ready for commercial uses within three to five years, he said.

## Users Look for ILM, Virtualization at SNW

A slew of new technology offerings are expected to be unveiled at storage show

BY LUCAS MEARIAN

**S**UPPLIERS OF STORAGE systems have made more product announcements in the past six months than in the previous two years, according to one research firm. This week's Storage Networking World conference in Orlando promises to represent a microcosm of that trend as dozens of vendors unveil new technologies.

Chief among those offerings are systems that can automate the migration of data between tiers of storage and simplify storage network management through virtualization, an abstraction layer between storage management applications and the storage hardware.

Although some information life-cycle management (ILM) and virtualization technologies have been around for more than a year, "the difference this time is you're going

to have large vendors talking about [it]," said Tony Prigmore, an analyst at Enterprise Strategy Group Inc., a research firm in Milford, Mass.

"ILM is something interesting that we talk about on a daily and weekly basis here," said

## SNW Product Announcements

■ **Hewlett-Packard Co., Microsoft Corp. and QLogic Corp.** plan to unveil a turnkey storage-area network.

■ **Broadcom Corp.** will announce its first serial RAID-on-chip device.

■ **NeoScale Systems Inc.** will announce the availability of its CryptoStor SAN VPN appliance.

■ **SANBlaze Technology Inc.** will announce a 4Gbit/sec. version of its VirtuaLUN Fibre Channel Target Emulation System.

Roan Winchester, director of backup management at Catholic Healthcare Partners in Cincinnati. Winchester said he will appraise the ILM technologies on display at the conference, sponsored by *Computerworld* and the Storage Networking Industry Association.

The company is in the process of consolidating regional servers that are 180 miles apart into its main data centers for centralized backup. Once that's done, Winchester plans to replicate data asynchronously between those centers for disaster recovery.

He said an ILM tool could help him reduce the total cost of ownership by easing data migration headaches and by moving older data off of high-end storage and onto midtier and ATA disk-based arrays.

## Other Vendor Plans

Several vendors expect to unveil ILM-type tools this week as demand from users such as Winchester increases.

IBM today will unveil the next generation of its Total-

Storage Open Software family for storage management. IBM's SAN File System Version 2.2 provides ILM capabilities through policy-based movement and deletion of files among various tiers of storage. And Hitachi Data Systems Corp. plans to show off one of its high-end TagmaStore Universal Platform arrays managing an IBM Enterprise Storage Server.

Tim Graham, team leader for data systems management at Virgin Atlantic Airways Ltd. in Crawley, U.K., said he's looking for tools to help him reduce the complexity of his backup environment while speeding up his network. Graham said he likes the idea of ILM tools, but because his data resides on a heterogeneous storage environment across the globe, he first needs tools to classify that data in order to determine its true value.

Vendors such as HDS, QLogic Corp. and Emulex Corp. are planning to demonstrate new 4Gbit/sec. Fibre Channel networks, which could double the speed of current storage networks.

Analysts and users, however, said 4Gbit/sec. technology, which resides in host bus adapters and switches, isn't needed yet by most sites.

☎ 50257

## Hackers Hit California With Massive ID Theft

Gain personal data of about 1.4 million state residents

BY PAUL ROBERTS

The state of California has warned residents that personal data may have been stolen from the University of California, Berkeley, after hackers hit a research database there.

The California Department of Social Services (CDSS) stated last week that the agency is working with the FBI to investigate the intrusion.

The incident involved a

computer that contained personal information on about 1.4 million recipients and providers participating in the CDSS's In-Home Supportive Services (IHSS) program, which provides home-care services to low-income elderly and disabled Californians. Names, addresses, telephone and Social Security numbers, and the birth dates of IHSS participants may have been stolen, said Carlos Ramos, assistant secretary at the CDSS. The data could be used to fake the identities of clients.

The state agency gave the

university the data to conduct research on the IHSS program. The compromise occurred on Aug. 1 and was discovered on Aug. 30 by UC Berkeley IT staffers using intrusion-detection software, Ramos said. Investigators said a hacker exploited a vulnerability in "commercially available database software," but they don't know whether the attack was targeted.

A database of personal information on people who may lack the technical sophistication to defend themselves against identity theft and are unaware that a database stores their data would be an attractive target for thieves, said Jonathan Bingham, president and founder of Intrusic Inc., a Waltham, Mass.-based maker

of software for spotting suspicious network activity.

Without adequate forensic information, investigators face a daunting task in reconstructing the intrusion and determining whether the IHSS database was compromised, let alone finding the culprits.

Meanwhile, the CDSS asked UC Berkeley to return the IHSS data and will investigate whether the researcher adhered to an agreement to protect personal information.

☎ 50269

Roberts is a reporter for the IDG News service.

Mark Hall is away this week. His column, *On the Mark*, will return in a future issue.



# SMARTER

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# IT Pay to Rise 10% to 15% Through 2007, Study Says

Better economy, demand for certain skills will drive increase, Meta says

BY THOMAS HOFFMAN

**A**N IMPROVING economy and heightened demand for technology workers with certain skills will help drive 10% to 15% salary increases for seasoned technologists through 2007, according to a new study unveiled by Meta Group Inc. this month.

The predictions seem to fly in the face of conventional wisdom following more than three years of a weak IT job market, a rise in organizations' use of lower-cost off-shore labor and marginal pay increases for full-time domestic IT workers.

Still, recruiters say there's plenty of evidence to support the predictions for salary gains, including a relatively low unemployment rate for U.S. high-tech workers and a shortage of new workers entering the market. According to the U.S. Bureau of Labor Statistics, the unemployment rate for computer and mathematical occupations at the end of September was 3.3%.

However, a half-dozen IT managers interviewed last week said they don't expect IT staffers to receive increases of more than 3% to 5% for at least the next year. "I just don't see a 15% increase over the next two years; the market doesn't warrant this," said Rick Peltz, CIO at Marcus & Millichap Real Estate Investment Brokerage Co. in Encino, Calif.

Peltz is looking to fill three

IT positions and has been screening résumés on Monster.com rather than advertising for the posts, which include an opening for a business analyst.

"If anything, there's an abundance of overqualified workers applying for this position," said Peltz, who anticipates providing his 15-person staff with 3% cost-of-living increases in 2005 "and maybe a little bit more for merit."

## Conservative View

"I do expect salaries to grow over the next several years, but I expect the growth rates to be much more modest," said Bill McQuiston, CIO at Truman Medical Centers Inc. in Kansas City, Mo. As the economy heats up and companies begin to invest more heavily in IT, he said, "we are going to see another shortage of [technical] people."

That maps with the perspective of several recruiters. Scot Melland, president of Dice Inc., a Web-based IT job board in New York, said technical job postings on his site are up more than 90% from September 2003 to September 2004. With fewer computer science graduates coming out of colleges, as well as stricter post-9/11 security restrictions on student visa programs for foreign-born students, "it's quite possible we could have a skills shortage in the coming years," he said.

Maria Schafer, author of the Meta Group report, said seasoned IT professionals with coveted database, networking, security, architecture and project management skills are already commanding 10% to 12% annual pay increases. The report is based on a survey of 650 companies that was completed in late May.

"I hear from people all the time who say, 'I don't know

how you can be saying this — I've been looking for a job for 19 months,' and I empathize with those people," Schafer said. But as the economy improves and companies invest more in IT, demand will rise, she said.

Analysts and recruiters said the number of domestic IT jobs being sent overseas is relatively small. And once the stock market improves and 401(k) and other retirement plans

start growing again, workers in their late 50s who had to postpone retirement over the past few years will begin leav-

ing the market in droves. "As baby boomers retire, the demand for replacements is never-ending," said Mark Anderson,

president of Execu-Net Inc., an executive job placement service in Norwalk, Conn.

Even in the currently stable, if lackluster, IT job market,

## MORE ONLINE

CIOs said last week that they expect to dole out nominal raises over the short term:

QuickLink 50250  
www.computerworld.com

## Top Demand

Most difficult types of IT workers to find

Application development  
24%

Security  
13%

Networking  
13%

SOURCE: 2004 IT STAFFING AND COMPENSATION GUIDE, META GROUP INC. STAMFORD, CONN. RESPONSES FROM 650 COMPANIES COMPILED IN MAY 2004

"it's still hard to find good, skilled technical workers," noted Mark Robinson, chief operating officer at WorkforceLogic Inc., a workforce management software provider in Sonoma, Calif. "As the market recovers, the demand will increase for labor."

50249

## Corporate Financial Results for Latest Quarter

Results have improved for most companies, indicating that IT spending is starting to show real growth again after a multiyear slump.


COMPANY	2004		2003	
	REVENUE	PROFIT (LOSS)	REVENUE	PROFIT (LOSS)
Apple Computer Inc.	\$2.35M	\$106M	\$1.72B	\$44M
CDW Corp.	\$1.5B	\$65M	\$1.2B	\$44M
Computer Associates	\$855M	(\$96M)	\$803M	(\$90M)
EMC Corp.	\$2.03B	\$218M	\$1.51B	\$158M
IBM	\$23.4B	\$1.8B	\$21.5B	\$1.79B
Intel Corp.	\$8.4B	\$1.9B	\$7.8B	\$1.7B
Keane Inc.	\$234.8M	\$8.1M	\$200.4M	\$5.5M
Mercury Interactive Corp.	\$165.4M	\$19M	\$126.1M	(\$6.7M)
Microsoft Corp.	\$9.2B	\$2.9B	\$8.2B	\$2.6B
PeopleSoft Corp.	\$699M	\$23.5M	\$634M	(\$7.3M)
RSA Security Inc.	\$76.7M	\$8.7M	\$64.5M	\$3.6M
SAP AG	\$2.27B	\$582M	\$2.14B	\$521M
Siebel Systems Inc.	\$317M	\$19M	\$321M	(\$59M)
Sprint Corp.	\$6.9B	(\$1.9B)	\$6.7B	(\$497M)
Symantec Corp.	\$618M	\$136M	\$429M	\$83M
VeriSign Inc.	\$325M	\$40M	\$268M	(\$31M)

SOURCE: COMPANY DATA

## THIS ISSUE

Find out how IT workers are making...





Every company demands  
**more productivity  
and flexibility.**  
Some of them **actually** get it.



Five of Wall Street's most prestigious financial institutions knew exactly what they wanted from an enterprise solution. More productivity, to keep up with an ever-changing global market. And real-time flexibility, to go from 32- to 64-bit applications without disrupting their business. They found both in the AMD Opteron™ processor with Direct Connect Architecture. It powers the world's highest performing x86 2-way and 4-way servers. And it helps speed up millions of financial transactions every day in trading stations and server farms. At AMD, we believe it's critical that technology should migrate on your terms to help you realize your unique vision. It's one of the reasons why HP, IBM and Sun offer enterprise-class solutions powered by AMD Opteron processors. Would you like to learn just how much of a difference they can make to your company? **Go to [www.amd.com/enterprise](http://www.amd.com/enterprise)**



## BRIEFS

## Cisco to Acquire Net Security Tools

Cisco Systems Inc. said it plans to buy Perfigo Inc., a San Francisco-based vendor of network access control software, for \$74 million in cash. Perfigo's Linux-based products will be added to Cisco's Network Admission Control line of tools for enforcing corporate security policies on PCs and other network endpoint devices. Cisco expects to complete the acquisition by the end of January.

## German Bank Signs IT Contract With HP

Hewlett-Packard Co. said it has signed a five-year, \$500 million IT outsourcing contract with WestLB AG, a bank based in Dusseldorf, Germany. HP will manage WestLB's global IT infrastructure and networks and take over some of its application development work. The deal, which is due to take effect on Jan. 1, includes the transfer of 450 IT workers from WestLB to HP.

## IBM Ends Holdout, Joins Liberty Project

IBM said it has joined the Liberty Alliance Project, a consortium that's developing proposed standards for end-user identity management tools. IBM had been reluctant to join the group, choosing instead to rely on its own technology. But the company was pushed to use Liberty's specifications by customers such as London-based Orange SA, for which IBM is developing a single sign-on service.

## Short Takes

**MCI INC.** announced that it will take a \$3.5 billion charge against its third-quarter financial results to reflect a decrease in the value of its assets. . . . **JBoss INC.** in Atlanta has added a business process management workflow tool to its roster of open-source software. JBoss will sell services and support for the jBpm technology.

## Microsoft Scales Back Passport Plan

Monster.com's defection prompts repositioning of authentication service

BY JORIS EVERS  
SAN FRANCISCO

**M**ICROSOFT CORP. is recasting ambitions for its .Net Passport identification system, saying the service will now be limited to its own online offerings and those of close partners.

Passport generated controversy five years ago when Microsoft pitched it as a user authentication program for online shopping sites, a notion largely rejected by users, investigated by government regulators because of privacy concerns and snubbed by Web site operators who balked at letting Microsoft control access to their sites.

Last week, a spokeswoman said Microsoft no longer sees Passport as a single-sign-on system for the Web at large.

Passport's repositioning comes as careers Web site Monster.com said it's dropping

support of the authentication service. New York-based Monster Worldwide Inc. was a banner user of Passport.

"Based on the adoption rates of Passport, which represented a low percentage of Monster users worldwide, a decision was made to make the most effective use of resources within Monster" and end support for Passport, said Monster spokesman Kevin Mullins.

Microsoft had been silent about the technology over the past few years and had essentially stopped development work. Indeed, it quietly scaled back several Passport components, including a directory of sites that support the service and a payments feature.

Microsoft has "learned a

lot" over the past few years and adjusted its ambitions for the service accordingly, said Brooke Richardson, lead product manager for MSN at Microsoft. "Going forward, the mission of the Microsoft Passport service will be to provide authentication services to Microsoft services and products and to Microsoft partners," she said last week.

**Microsoft's interest in hosted services has decreased since 2001.**

.....  
**MATT ROSOFF**, ANALYST,  
DIRECTIONS ON MICROSOFT INC.

The Passport decision is another signal that Microsoft is returning to its software roots, said Matt Rosoff, an analyst at Directions on Microsoft Inc. in

Kirkland, Wash. "Microsoft's interest in hosted services has decreased since 2001," he said. Microsoft acquired the Passport technology in 1998 when it bought Firefly Technologies and initially used it as an authentication service for Hotmail and other services.

Meanwhile, Passport has faced competition from the

Liberty Alliance, formed in late 2001 to create an open authentication platform. The alliance, originally sponsored by Sun Microsystems Inc. and about 30 other companies, has continued to expand, and its specifications are supported in several products.

In light of the fact that support for Passport is shrinking and Microsoft signed an interoperability pact with Sun in April, Microsoft may elect to join the Liberty Alliance or support the group's specifications. Microsoft and Sun have said identity management is one of the first areas in which they hope to work together.

Last week, IBM announced that it was joining the Liberty Alliance. Microsoft has said that it might join the group, and IBM's move could put pressure on it to do so, said Ronald Schmelzer, a senior analyst at ZapThink LLC in Waltham, Mass. **50258**

*Robert McMillan contributed to this story. Evers and McMillan write for the IDG News Service.*

## Corporate Teamwork on Security Seen as Lacking

BY JAIKUMAR VIJAYAN

A lack of cooperation among IT, physical security operations and financial risk managers is hindering efforts to upgrade corporate security, according to a report that was released last week by The Conference Board Inc.

The separate silos in which many businesses continue to put those three functions has produced corporate cultures that encourage the hoarding of vital security information, said the report, which was based on interviews with more than 200 senior executives at major U.S. companies.

Businesses need to find a way to bridge the gap and develop "a common frame of reference," said Tom Cavanagh, a

corporate security specialist at The Conference Board, a New York-based research organization. "What you need to have is a way for everybody to be on the same page and speaking the same language."

Cavanagh's advice echoes comments made at last month's ASIS International 2004 conference in Dallas, where corporate managers and analysts cited a growing need to unify the management of IT and physical security [QuickLink 49788].

That viewpoint is "absolutely right," said Dennis Treece, director of corporate security at the Massachusetts Port Authority in Boston. "Until the various factions stop bickering over turf, we're going to find

any holistic security improvements terribly difficult [to achieve]," Treece said.

He added that the separate security-related functions within companies "all have different points of view, different cultures, different career paths, different educations and even different vocabularies."

## Seeking Common Ground

Physical security professionals who typically deal with human intelligence issues and technologies such as intruder alarm systems often have little in common with their IT security counterparts, said Eddie Schwartz, chief technology officer at Fairfax, Va.-based consulting firm Securevision LLC.

Similarly, risk management executives tend to come from financial backgrounds and often have little technology savvy, said Schwartz.

The resulting communication breakdowns often lead to gaps in security, said Lew Wagner, chief information security officer at Clarian Health in Indianapolis. He added that long-established corporate hierarchies and territorial boundaries can make it difficult to integrate the different functions.

"Each of these groups has already carved out their niches and protected areas and . . . have to be shown that this is a way to enhance what they're doing," Wagner said.

Instead of breaking down corporate silos and establishing new chains of command, the emphasis should be on building a comprehensive "situational awareness" capability that lets executives from the different groups compare high-level security information and look for trends, Schwartz said. **50263**





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\* Source: Fabric Computing: Beyond the N-tier Data Center, RBC Capital Reports Oct 2003

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## GLOBAL DISPATCHES

### An International IT News Digest

#### Australian IT Group Urges Quality Push

SYDNEY

**T**HE AUSTRALIAN Computer Society (ACS) has called for the widespread adoption of software quality assurance methodologies and professional standards to enhance Australia's status as an offshoring destination and reduce the risk that faulty software will be developed.

Speaking at the Software Industry Action Group's conference in Melbourne last week, ACS President Edward Mandla said Australia's federal government should push local vendors to use internationally recognized standards when developing and supplying software. Mandla also urged the government to require that employees of IT vendors become members of professional associations that can ensure they are suitably qualified, subscribe to a code of ethics and are subject to sanctions for breaches of professional standards.

"Australia is a world-class software developer, but we face increasing competition from offshore," Mandla said. "If we are to remain competitive and secure our place in the global market, we must be able to demonstrate our professional standards and credentials."

■ SIOBHAN MCBRIDE, COMPUTERWORLD TODAY (AUSTRALIA)

#### Cisco Offers IT Skills To U.K. Prisoners

LONDON

**C**ISCO SYSTEMS INC. is working with the U.K. government on a pilot program to establish academies that will teach IT skills to inmates, initially at 11 prisons, a spokesman for the country's Home Office said last week. The Home Office, which oversees the U.K.'s justice and immigration system,

views the training program as a way to prepare prisoners for jobs after they finish serving their sentences and re-enter the community at large, the spokesman said.

**GLOBAL FACT**  
**ONE-THIRD** of Ireland's companies lack a business continuity program.  
■ IDC, DUBLIN

The program currently has 900 students, who take part in twice-a-week classes over six-month sessions, the spokesman said. Cisco is the only company involved in the program at this point, he added. The project is a philanthropic offshoot of Cisco's Networking Academy Program, said Cisco spokeswoman Perveen Akhtar.

■ LAURA ROHDE, IDG NEWS SERVICE

#### Italians Not Fond Of Online Banking

CAMBRIDGE, MASS.

**I**TALY'S BANKS are missing out on online opportunities because Italian consumers are far more reluctant to use online banking than other Europeans are, according to a recent report by Forrester Research Inc. Italian consumers have a special fondness for cash and don't see the appeal of banking online, the report said, adding that Italy's banks haven't produced compelling online services.

Forrester analysts Elena Giovannini and Benjamin Ensor suggested that banks might boost participation by providing free trials of online banking, service guarantees, and better prices and interest rates for online users. ☎50211

Compiled by Mitch Betts.

## Briefly Noted

**Research In Motion Ltd.** is now offering its BlackBerry wireless service in India, through a partnership with Delhi-based Bharti Tele-Ventures Ltd., the companies announced last week.

■ JOHN RIBEIRO, IDG NEWS SERVICE

**Groupe Steria SCA**, an IT services company based in Paris, is negotiating to acquire Mummert Consulting AG in Hamburg, Germany, in hopes of expanding into the German IT services market.

■ PETER SAYER, IDG NEWS SERVICE

**African Sky**, Africa's first specialized computer waste disposal and recycling company, was launched last week in Johannesburg. CEO Allan Werth said that less than 2% of computer waste in South Africa is recycled and that most obsolete equipment ends up in dumps.

■ SAMANTHA PERRY, COMPUTING SOUTH AFRICA

## Global IT Challenges Mirror Those in U.S., SAS Executive Says

BY DON TENNANT  
LAS VEGAS

**Art Cooke** is president of SAS International, the global arm of Cary, N.C.-based business intelligence software vendor SAS Institute Inc. At the Better Management Live conference here last week, Cooke spoke with Computerworld about the globalization issues confronting U.S. companies in general and SAS in particular.

BI users and vendors talk a lot about coming up with a "single version of the truth." For companies with global operations, what are the obstacles to attaining that single version? Most organizations are dropping back to database and ERP technology, which is giving them some problems.

And those organizations aren't flexible enough to be able to pick out the data from all these operations worldwide and bring it together into a [data] warehouse. A lot of organizations don't think it's possible and will try to rationalize the operational systems underneath, rather than putting something like SAS on top of it to bring all that data together very quickly.

Many CIOs have been bitten so badly by these huge ERP implementations that they almost don't want to touch it and almost don't want to acknowledge that there's an issue there because it's far too dangerous politically. One of

the things we're seeing in Europe now is people are starting to lose their jobs because of failed ERP implementations — they continue to shovel money down that huge hole.

We've got something out there from SAS that can actually do [ERP consolidation] — it's possible. But one of the issues we have with IT is that because they've been bitten so badly before, people are

shy about looking at these issues with an open mind.

**What do U.S. companies that need to expand their IT operations to locations overseas tend to overlook?** They tend to make the same mis-

takes they make in the States. When they put new infrastructure in, they probably put parallel infrastructure in rather than looking for a more clever way of doing it. It may be possible to install much more efficient systems. And

"go for good local employees" would be the other general advice I would have.

**What IT capabilities do you think tend to be stronger outside the U.S. than inside the U.S.?** All these markets are pretty similar. IT is generally struggling with the same issues, whether you're in Hong Kong or China or Australia or Russia.

**How much software development does SAS do outside of the U.S., and is any of the offshore work outsourced?** We don't outsource anything — all the development work is done in-house. The vast majority of the work is done in Cary. We have local-language adaptation centers in Japan and Beijing. We have 100 people in India who are doing a combination of vertical-industry work and specific testing of particular modules of the core technology.

**How have political issues, specifically the war in Iraq, affected**

**your global business?** We missed a quarter last year — Europe just stopped for a quarter. There was a lot of uncertainty about what was going to happen, so a lot of decision-making just ground to a halt. It's been picking up, but there was a definite [cut-back] in Europe. Less so in Asia, but also in Asia it was noticeable.

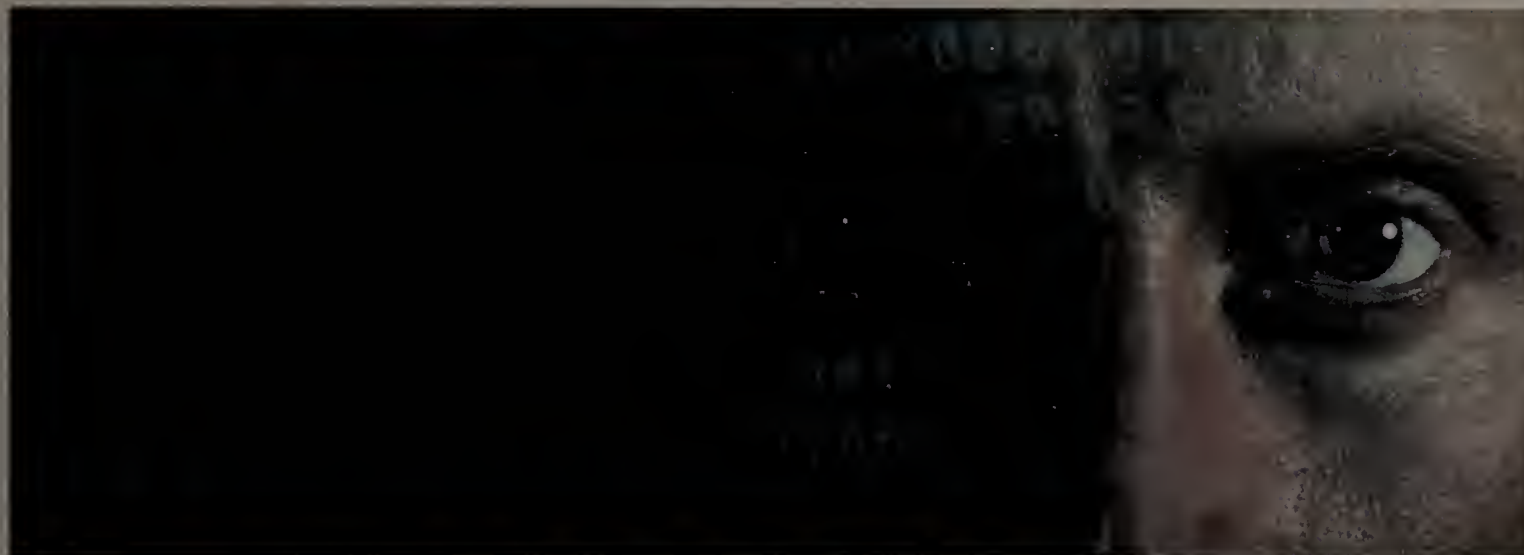
**What does SAS do well from a globalization perspective, and what does it need to do better?** Any company that works at a global level needs to be looking for best practices wherever you find them, and that's an ongoing search. Never believe that you own the truth — always look for it wherever you might find it in your organization. That's part of this theory of bringing what we're doing out in the field back centrally so we can send it out again. That's the thing we're continuously trying to improve. ☎ 50224



**Q&A**



# ROBUST OBJECTS AND ROBUST SQL



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Continued from page 1

## iSeries

at Perishable Distributors of Iowa Ltd., listened to assurances from IBM that it's committed to the line, he pointed out that they referred to it as both the iSeries and the AS/400. "If they can't identify the product, how can they focus on it?" Swinehart said.

IBM's marketing of the iSeries is an issue of great importance to users, many of whom have invested a large part of their careers in the 16-year-old technology. Some said they worry that the iSeries line, which now runs AIX and Linux in addition to its flagship i5/OS operating system, is gradually being blended into other product offerings, particularly IBM's pSeries family of Unix servers.

Trevor McCullough, an information systems project leader at Saint Laurent, Quebec-based footwear maker

Genfoot Inc., noted that the iSeries isn't seen as having wide-ranging capabilities by nonusers. For example, not everyone is aware that it can run Linux, Java and IBM's WebSphere software, he said.

"It can do so much, and it's still regarded as an older platform," McCullough said. He warned that if the iSeries is widely perceived as a legacy system, it may become just that.

### Restoring iSeries' Luster

Mike Borman, who three months ago was appointed general manager of the iSeries division within IBM's eServer group, acknowledged that more has to be done to expand the midrange line's user base beyond the 200,000-plus customers that have bought the systems. "I think we have lost a little luster on our star here, and we need to improve that," he said. "We have to get our image back to where it says that [the iSeries] is one of the

### Revenue Hit

IBM said revenue increased year over year during the third quarter for all of its server lines except the iSeries. The company blamed the iSeries decline on a product transition to its Power5 processor.

**zSeries (mainframe) +12%**

**pSeries (Unix/Linux) +1%**

**iSeries (midrange) -26%**

**xSeries (Intel-based) +26%**

top two or three franchises in the industry."

Borman said he wants to convince independent software vendors to help raise the visibility of the iSeries line by making it an integral part of their product mixes, as they did in the late 1980s and the 1990s, before Windows-based servers and other newer systems began attracting attention. IBM plans to undertake that effort in phases, focusing first on the top 300 vendors

and then expanding that number by another 2,700.

Although Borman said he thinks that IBM has a strong iSeries technical support staff and an able group of business partners, he also wants support to improve.

"We have a set of business partners that are really good, and we have a set of business partners that we need to improve their skills," Borman said. IBM also has to ensure that its engineers who work with customers have up-to-date skills, he said, citing feedback from two large users who said that isn't always the case.

William Machinist, director of IT at Borg-Warner Morse TEC Inc., an automotive parts supplier in Ithaca, N.Y., described the iSeries as "rock solid." Machinist said he isn't worried about its future, but he and some other users said IBM needs to work closely with schools to ensure that students get training on the iSeries architecture.

Machinist said he heard "a real sense of commitment" from Borman at the Common conference. "He knows what he needs to do, and he's going to do it," Machinist said.

☎ 50261

## HP Upgrades Novadigm's System Configuration Tools

**Simplifies user interface, adds more automation**

BY MATT HAMBLÉN

Hewlett-Packard Co. last week announced an upgrade of the configuration management software it acquired in an April acquisition of Novadigm Inc., saying it's adding a simplified user interface and capabilities for automating hardware setting updates.

The new release of Novadigm's Radia product is being renamed HP OpenView Change and Configuration Management and is available now. The software can be used to automate repetitive systems management tasks, such as configuration changes made to PCs and servers, on a regular schedule, according to HP.

The company said it has also simplified a configuration analysis tool for identifying potential conflicts in proposed PC configurations. In addition, more information is available on the inventory of services and applications running on Windows, Unix and Linux servers, HP said.

KeyCorp, a Cleveland-based bank with \$88 billion in assets, has used Novadigm's tools for the past four years and welcomes the enhancements of-

fered by HP, said Scott Donaldson, vice president of software distribution and workspace automation. However, he added, KeyCorp "doesn't have a lot of appetite" for the newest version, having installed the previous release, Radia 3.1, within the past month.

### Big Learning Curve

Donaldson described the Radia product as "a complex tool" that has a big learning curve for systems administrators but is well worth the effort. KeyCorp has seen a big improvement in the time it takes to roll out applications to end users thanks to Radia, he said.

After investing about \$1 million in the software, the bank estimates that it has reduced the total cost of ownership on its 23,000 PCs by \$4 million per year. According to Donaldson, it now takes only two IT staffers to handle change and configuration management chores on all the PCs.

Donaldson said he's pleased with HP's acquisition of Novadigm and its plan to leave the Radia technology intact. He also applauded HP's new support for Linux systems. "I'm glad they aren't pigeonholed on Microsoft," he said.

☎ 50233

## IBM Makes Effort to Improve System Availability

TORONTO

IBM has launched an initiative focused on ensuring that the iSeries and its other server lines are highly available, an area of increasing interest among users who can't afford system downtime because of round-the-clock global supply chain demands.

John Reed, the IBM executive who was picked four weeks ago to lead the development of the company's High Availability Design Center, previously worked for the iSeries division as product and business operations manager.

"In many cases, our clients may be trying to do high availability but don't have all the pieces put together to make it a truly resilient set of infrastructures," Reed said at last week's Common user group conference. He added that the center could lead to new products, services and business partnerships.

IBM is only a few weeks into developing the center and hasn't settled on a location yet, al-

though Reed said it may be located at a facility in Poughkeepsie, N.Y. The company plans to begin working with users at the center this quarter.

Part of the plan involves assembling best-practices guidance and tools, according to Reed. IBM will conduct system assessments, and help users define and develop high-availability architectures and run application benchmarks, he said.

IBM's increased interest in high availability raised concerns about pricing and other issues among some iSeries users.

Gerald Lake, a programmer/analyst at Sovereign Specialty Chemicals Inc.'s Buffalo operations, said increasing demands from outside auditors for IT redundancy prompted his company to improve system availability. As part of a server consolidation project, Sovereign converted an iSeries machine located at a different facility than the one that houses its primary server into a backup system, Lake said.

But Lake eyed IBM's plan warily. "The way IBM charges so heavily for everything, I think a lot of people are going to continue to do everything on their own," he said.

Pam Mathiesen, a computer operator at Great Plains Communications Inc. in Blair, Neb., said the telecommunications service provider has been using a third-party product to ensure high availability of its data. She added that she hopes IBM moves in the direction of partnerships with other vendors so it doesn't undercut the position of third-party suppliers.

Sporting goods maker Adidas-Salomon Canada Ltd. in Toronto has been able to count on the functionality built into the iSeries to maintain its operations, said Paul Leone, vice president of supply chain and IT logistics. But, Leone noted, Adidas will have to address high availability, especially as more of its orders arrive via the Web.

- Patrick Thibodeau





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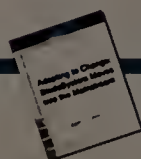
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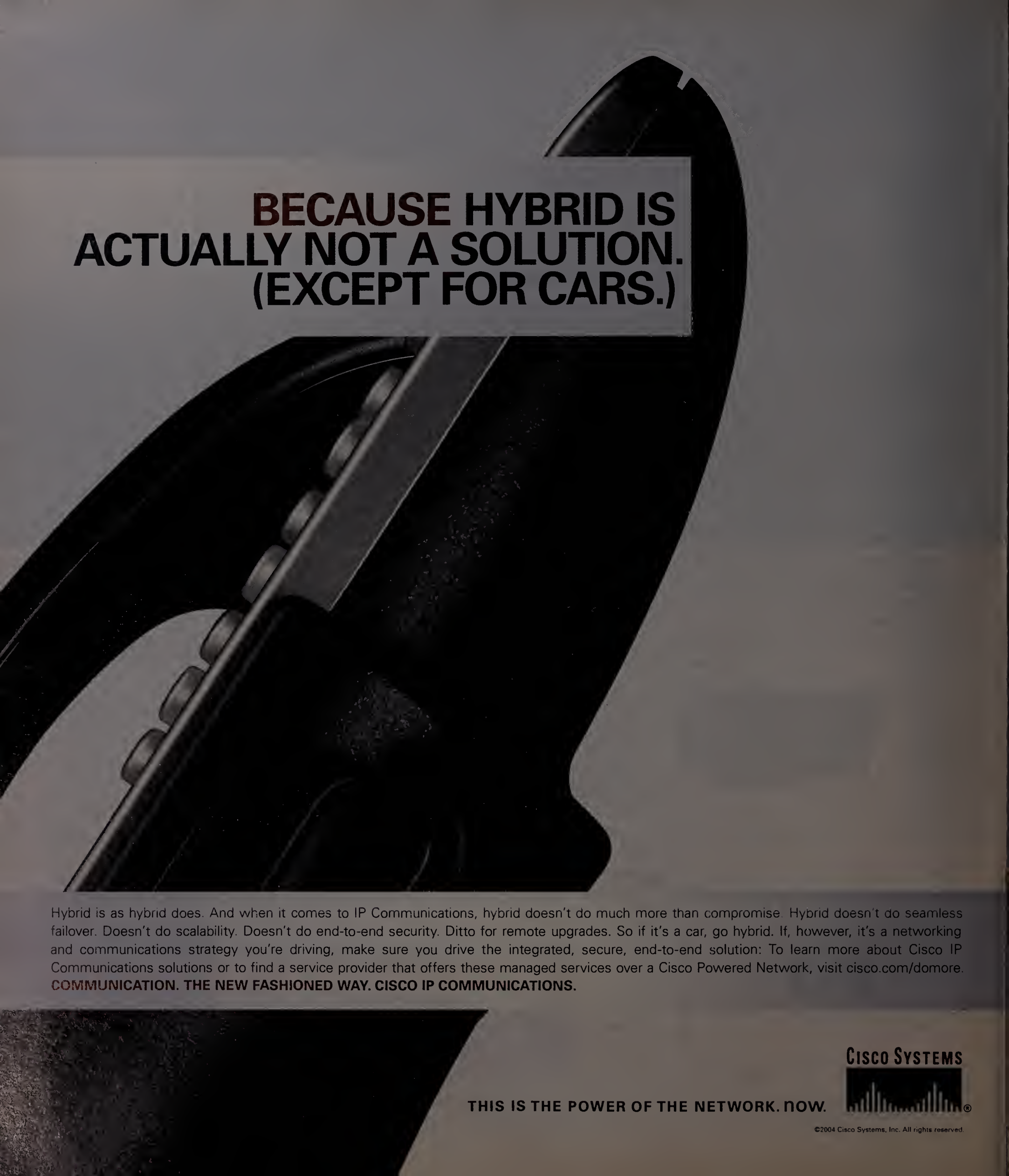
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# Red Hat Exec Addresses Challenges to Open-Source

BY JOHN RIBEIRO  
BANGALORE, INDIA

Though open-source technologies are infiltrating IT operations throughout the world, its champions must overcome several potential roadblocks in the years to come to ensure that their growth continues. Michael Tiemann, vice president of open-source affairs at Red Hat Inc., offered his take on the future of open-source and Linux in an interview with IDG News Service this month.

**Are more and more developers using open-source technologies worldwide?** The leading developer regions I have seen have been the U.S. and Europe. But I think that is going to be changing very rapidly. South America, Brazil, Venezuela [and] Peru have all either announced or are in the process of announcing mainstream Linux work for government. When Brazil puts their developers on open-source, that is going to be a huge increase.

**What is the biggest challenge for the open-source community?** The biggest challenge right now is that there are not nearly as many open-source developers as there could be. The biggest challenge is getting more people excited [about open-source development]. The open-source community is a challenging environment to work in. Some developers respond positively to the meritocracy of open-source, and some do not.

**What are the management challenges involved when you scale to, say, 100 million open-source developers spread across a number of countries?** There is a study from James Herbsleb at Carnegie Mellon University about both open-source and proprietary projects. [The study found that] 10 to 15 developers are typically responsible for 80% of a project. What that math tells you is that open-source scales by being able to have more and more projects. I don't ever think that there will be 100 million people working on one library in Lin-

ux. Because of the supermodularity of open-source, the ideal resource allocation for 100 million developers is to be working on, say, 10 million projects.

**Is there a danger that forks from standard Linux will be created as the number of Linux developers increases?** I just don't think it will happen, because we just haven't seen it. Sun claims that they need to keep Java proprietary so that it won't fork. And yet as proprietary Java, it did fork. [Meanwhile] IBM came out and released Eclipse, and lo and behold 100 companies joined it and there has been no forking on Eclipse.

**The Linux Standard Base 2.0 of the Free Standards Group attempts to get some standardization into various distributions of Linux. Will Red Hat ship products compliant with LSB 2.0?** We are really looking toward LSB 3.0 because 2.0 is not compatible with prior decisions we have made. We have been very successful to certify against LSB Version 1.0, and we will continue to stay compatible with that. We think 2.0 overreached in what it was trying to do. We have it from the LSB people that there will be a 3.0 out in less than six months, and we are quite confident that that version will be adequate for our needs.



**“If the local Indian companies are developing open-source software according to open-source principles, then we benefit in any case.**

.....  
**MICHAEL TIEMANN,**  
vice president of  
open-source affairs,  
Red Hat Inc.

**As localized versions of Linux take root in countries like China, Malaysia and Thailand, with active promotion of the local governments, how does Red Hat plan to**

**counter that?** Some Indian companies the other day asked how we were prepared to deal with competition from Indian companies. I said that if the local Indian companies are developing open-source software according to open-source principles, then we benefit in any case, because we have the libraries that the software will need.

50194

Ribeiro is a reporter for the IDG News Service.

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# Fed Law Doesn't Yield E-voting Consistency

Some states buy e-voting machines; others wait for federal guidelines

BY PAUL ROBERTS  
BOSTON

**T**WO YEARS after Congress passed the Help America Vote Act (HAVA) to phase out older voting systems, there is little consistency in the adoption of the law and its provisions. While some states moved quickly to enact HAVA, officials elsewhere are waiting for more guidance to verify which new voting systems meet federal standards.

HAVA addresses myriad problems that tarnished the 2000 presidential election. The act calls for the provisioning of \$3.9 billion in federal funds to improve the election process, with \$325 million earmarked to replace outdated machines.

While HAVA doesn't mandate particular voting technologies, it does require that new systems be accessible to disabled people by 2006. That requirement prompted many counties to quickly buy new voting equipment, mostly so-called direct recording electronic (DRE) systems with

features to accommodate impaired voters.

The federal money for voting systems is especially welcome in poorer states, said Dan Seligson, editor of Electionline.org, a Washington-based nonprofit group that tracks election reform.

In Wyoming, where mechanical-lever voting machines purchased years ago are still in use, HAVA will eventually allow all of the state's 23 counties to upgrade to some form of DRE technology, said Secretary of State Joe Meyer. Currently, only one county uses DRE technology, he said.

In South Carolina, many counties bought early DRE machines in the 1980s using state matching funds and then weren't able to update those systems once state funds dried up, said Donna Royson, deputy director of the South Carolina State Election Commission. HAVA money is helping South Carolina move to a uniform system of voting machines statewide, she said.

While HAVA has made money available to help with purchases and speed the replacement of older machines, the legislation has left it up to each state to develop its own plan to comply with the legislation and requires matching

funds from states to qualify for federal dollars.

"HAVA sets federal mandates on voting. However, nowhere in the mandates does it say what machines to use, how many there should be per precinct. Frankly, there isn't even a mandate to replace punch cards and lever machines," Seligson said.

## Variable Progress

In states with a tradition of top-down management, HAVA has led to uniformity. In states with a tradition of local control, the law's leniency has resulted in a patchwork system of voting technology and slower progress.



**ELECTRONIC VOTING MACHINES** have been installed in 27 states (in green), but lawsuits filed in New Jersey and Florida may halt or tighten electronic voting with such machines.

"One reason we're a bit slower is because we're reluctant to hand counties unfunded mandates," said Jonathan Black, director of research for the Texas secretary of state's office. "We like to give counties as much choice as possible."

An informal survey by the IDG News Service of counties with DRE machines found wide variability in the number and type of DRE systems to be used this year, with some counties relying on a small number of machines to handle what officials expect to be a record turnout.

The problem, say voting experts, is a system that has long relied on local money rather than federal dollars to fund elections, leading to disparities among counties.

For example, South Carolina is already in the first phase of implementing its HAVA plan, which calls for the deployment of state-purchased iVotronic

machines from Election Systems and Software Inc. The plan calls for one iVotronic DRE machine for every 200 voters.

But elsewhere, state governments and localities have put off purchasing DRE equipment as they wait for the federal government to provide more guidance. The result is that states like Maryland and Nevada are using DRE technology statewide, while others, such as Ohio, Pennsylvania and Wyoming, are using it only in certain areas.

"States are all over the map," said Wyoming's Meyer. "HAVA was supposed to have standards to protect us in terms of these voting systems, but now they say they're going to have them in 2005 at the earliest."

Wyoming won't choose new equipment until after the Nov. 2 election, Meyer said.

HAVA sets strong guidelines on issues such as accessibility but is silent on many of the most pressing problems the U.S. election system is facing, leaving it to states and localities to decide which technologies to use and how many machines are needed, Electionline.org's Seligson said.

While HAVA can help people with disabilities and prevent voters from being turned away at the polls, Seligson said, it's unlikely to change disparities regarding which voting systems are used. **50229**

Roberts is a reporter for the IDG News Service.

## Skeptics Create System to Monitor E-voting

BOSTON

A group of technology experts concerned about the fate of electronic voting machines on Nov. 2 used some tools of the trade – the Web and open-source technologies – to create a system to monitor e-voting on election day.

The new technology, dubbed the Election Incident Reporting System (EIRS), was developed by technologists from the Veri-

fied Voting Foundation and Computer Professionals for Social Responsibility (CPSR). The system will be used by the Election Protection Coalition, which consists of a variety of organizations, to identify and fix problems with DRE machines on Nov. 2.

Work on EIRS started about four months ago, according to Will Doherty, Verified Voting's executive director. Since then, a team of 30 to 35 people – most-

ly volunteers – has worked to ready the system by Election Day.

The team includes five core developers, five testers, three user-interface specialists and a four-member architecture team responsible for security and hardware, said Erik Nilsson, chairman of the CPSR working group on voting technology.

The team gained an advantage from using open-source tool kits, such as PHP Surveyor,

to create online surveying instruments and manage the results, he said.

Other open-source software used in the EIRS project includes AdvoKit, which manages tasks, campaigns and volunteers, and MapServer, which produces clickable maps that can show the locations of past problems.

Doherty said the developers are working on a final feature that will offer more detail about election incidents at a specific site. Currently, when a user clicks on a map to view incidents

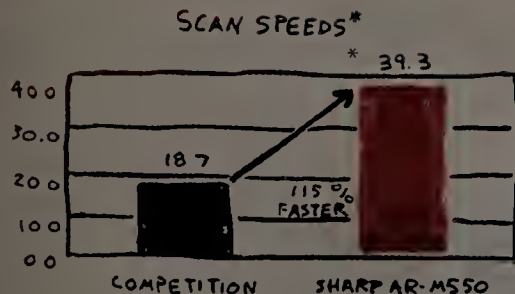
in a specific location, only the number of incidents is displayed. The upgrade will provide far more details of particular incidents, Doherty said.

If all works as planned on Election Day, incidents reported via EIRS will prompt the timely dispatch of experts to problem locations. The team includes some 1,300 TechWatch volunteers recruited by Verified Voting to monitor the DREs.

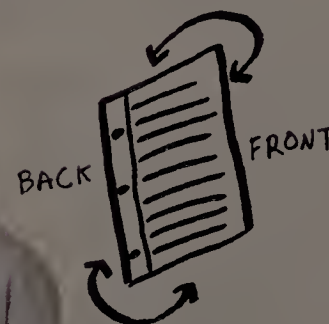
"We're placing big bets on this," said Nilsson.

– Elizabeth Heichler





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## Microsoft to Link Phones, Messaging

BY JUAN CARLOS PEREZ

Microsoft Corp. last week said it's developing a front-end collaboration application that

will let end users link their office telephones to the upgraded instant messaging server software the company plans to

release by the end of the year.

The client application, code-named Istanbul, is due by mid-2005. It's being designed to

provide a single user interface for instant messaging, telephony and PC-based voice- and videoconferencing capabilities supported by Microsoft's Live Communications Server (LCS) 2005 software.

With the built-in telephony links, "end users will be able to think of their enterprise PBX phones as part of the overall real-time collaboration infrastructure," said Ed Simnett, Microsoft's lead product manager for Istanbul. Users will also be able to configure the software to call outside a company's internal switchboard, Simnett said. "Any phone becomes an addressable endpoint to LCS," he said.

Istanbul will be the preferred front-end application for LCS 2005, replacing the Windows Messenger software that works with LCS 2003. Another planned feature is deeper integration with other Microsoft products, Simnett said. For example, an Exchange user could configure an out-of-the-office message to show up not only when someone sends him an e-mail but also when someone tries to reach him via LCS 2005.

### Idea in Search of a Market

Istanbul is an attempt by Microsoft "to merge the idea of real-time computer communication and real-time phone communication," said Nate Root, an analyst at Forrester Research Inc. Combining those functions would tie "instant-messaging-type clients to the PBX infrastructure that most big firms already have," he added.

But, Root noted, there isn't a lot of demand among corporate users for the functionality Istanbul will provide.

"Istanbul is a solution for a problem most users and companies don't know they have," he said. "The first and biggest hurdle [Microsoft] has got to get over is cultural: convincing people that this is a new and better tool to make their lives easier."

To make the Istanbul concept successful, Microsoft must work aggressively with third-party software vendors to extend the technology's functionality, said Paul Ritter, an analyst at Wainhouse Research LLC. **50213**

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Perez is a reporter for the IDG News Service.



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## Google Tests New Desktop Search App

BY TODD R. WEISS

Google Inc. this month began offering a beta version of a desktop search application

that catalogs files, e-mail messages and other information stored on PCs and then enables end users to run

searches against the data.

The beta release gives Mountain View, Calif.-based Google a head start over rivals

such as Microsoft Corp. and Yahoo Inc. in the race to provide more advanced search tools that can help users find information on their PCs.

But Gartner Inc. analyst Allen Weiner predicted that

Microsoft's development efforts will "really heat up" by the end of the year. "This will without question accelerate Microsoft's timetable," Weiner said.

The Google Desktop Search beta code is available free of charge as a 446KB download from the company's Web site. The application is designed to search Word, Excel and PowerPoint files as well as e-mail in Outlook and Outlook Express. It can also search text and Web site browsing records in Internet Explorer and instant messaging exchanges stored in AOL Instant Messenger, Google said.

The desktop software will be integrated with Google's WebSearch engine for displaying search results. But Google said the search tool won't share information about the content stored on computers with its servers or other PCs, unless users give their permission.

"It's pretty impressive that a download that quick and small can be so powerful," said Dana Gardner, an analyst at The Yankee Group in Boston. "We really haven't seen anything like this for free before."

### Privacy Concerns

Gardner noted, though, that the search tool raises potential issues for companies if end users install and use it without notifying and getting approval from their IT departments.

"There are some privacy and IT management issues here," he said. "For home or personal use, using it makes a great deal of sense. But for the enterprise, these caveats need to be reviewed and discussed."

Cindy Cohn, legal director of the Electronic Frontier Foundation, said the San Francisco-based nonprofit privacy group has few privacy concerns about the software so far.

"It really doesn't report much of anything back to Google," said Cohn, whose organization was given a demonstration of the search tool by the vendor. **50214**

Juan Carlos Perez of the IDG News Service contributed to this story.

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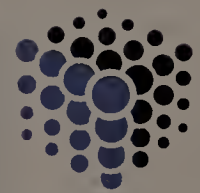
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DON TENNANT

# Unchosen Exposure

**T**HERE WAS A TIME when giving up one's privacy tended to be a matter of choice. In the early '80s, I worked for the National Security Agency, and for the sake of the job, I elected to sacrifice my privacy to a degree that most people would find appalling. I allowed myself to be polygraphed on a regular basis, which entailed being strapped into

a chair with sensors wrapped around my torso and attached to my fingertips. You know that dream where you're standing in a roomful of people in your underwear? Multiply the feeling of exposure a few thousandfold, and you'll have some idea what it's like to have your thoughts bared.

The biggest problem I had with it was that the technology was imperfect (it still is). I happen to have a lot of Iranian friends, and I can remember being repeatedly grilled about that during those days of embassy hostage-taking. What if there were some sort of false reading that put my friends (not to mention me) under suspicion? Let me tell you, that's a tough thing to have weighing on your mind when those sensors are recording every flinch and twitch.

To some extent, sacrificing one's privacy is still a matter of choice. I've chosen, for example, to use an electronic toll tag in my car to avoid the tollbooth congestion on the Massachusetts Turnpike. Many of the drivers who wait interminably in lines while I breeze through do so because they detest the thought of the state of Massachusetts recording their whereabouts. I, on the other hand, just can't fathom that anyone working for the government gives a rat's tail about where I drive, as long as it's on the right side of the road.

The problem I have, again, is with the technology. Just last week, I re-



DON TENNANT is editor in chief of *Computerworld*. You can contact him at [don\\_tennant@computerworld.com](mailto:don_tennant@computerworld.com).

ceived a stern "toll violation warning letter" proclaiming that my vehicle was recorded as an unauthorized user of the electronic toll collection system and presuming my guilt by warning me against "subsequent violations." And while I'm not paranoid about my privacy, I have to admit that seeing the photo of my car taken during my

"violation" was a little off-putting. Never mind that the toll-tag system malfunctioned, which they acknowledged prior to replacing my faulty tag — I still have to appeal the warning and clear my name.

But it was my choice to use the system. The real concern, and what's

changed a lot in recent years, is that in many cases, we no longer have the choice. I had no option but to allow my checked baggage to be opened for inspection at the airport when I flew out of Providence, R.I., earlier this month. The technology used to scan its contents was apparently ineffective, and a TSA guy in an ill-fitting white shirt had a field day rummaging through it after it passed through the huge X-ray machine.

The crowd watching the spectacle just didn't need to know that I'm a boxer-briefs kind of guy.

So this, more than anything, is an appeal from an end user. When you carry out an IT project, be it a security implementation, an enterprise search capability — the big brother, you might say, of the desktop search technology that Google introduced this month (see page 22) — or any other system with privacy ramifications, remember that for the most part, users don't have a say in the matter. We're relying on you to get the technology right. Whatever choices there are now are largely yours. **Q 50210**

*Don Tennant*



PIMM FOX

# E-mail Has The Power To Destroy

**I**USED TO THINK that e-mail would generally benefit business through the easier flow of information that it affords, making it possible for employees to be more productive and communicate more efficiently.

The reality is more prosaic. E-mail, it turns out, is just another way for us to demonstrate our stupidity. It's the poisoned chalice of white-collar crime.

Eliot Spitzer, New York's attorney general, has been sifting through the electronic trash bin. His investigation into insurance broker practices has unearthed incriminating evidence that will help him build a case alleging that some brokers in the U.S. have been rigging their bids. How did he find this evidence? By following the e-mail trail.

Spitzer, who made a name for himself by going after the mutual fund industry for illegal trading activity and investment banks for breaching the wall between research and banking, has recovered some employee e-mails that are proving to be devastating.

His current probe of insurance broker Marsh & McLennan has turned up a transcript of an e-mail sent by an employee of its Marsh Inc. unit. In the message to a manager at insurance company Munich-American RiskPartners, the employee asks for someone — a "body," to quote the e-mail — to make a phony bid on an insurance policy. Spitzer contends that Marsh had already decided to give the business to another insurer that had agreed to a kickback.

The e-mail isn't subtle. The writer jokes about having someone from the insurer's janitorial staff attend the meeting to make the fake bid.

What was the author thinking?

Was the author thinking?

Is this the way e-mail works in your company? Is there any supervision? Does your company offer training in what's acceptable to include in e-mail





communications? It should, of course, because records of illegal actions, whether made in e-mail, documents or voice mail, have the power to cause enough havoc to bring down a company or, at the very least, ruin a career.

Frank Quattrone, the former deal-maker at Credit Suisse First Boston, was nabbed by the feds because of an e-mail that described his activities in relation to the practice of "spinning" — the allocation of shares in initial public offerings to favored clients. (Quattrone was eventually convicted of the lesser charge of obstruction of justice.) And when Enron was imploding, the energy trading company's auditors at now-defunct Arthur Andersen used e-mail to discuss how best to destroy internal memos and other evidence.

You could say that the illegal use of e-mail is much more widespread than those high-profile cases indicate, though. For example, how often have you had to delete e-mail from someone in Nigeria trying to elicit your help (and get some of your cash) in some scheme to get money out of the country?

You can't prevent people from using e-mail to encourage illegal acts, engage in backbiting or express prejudicial thoughts. But you can make it clear that your company's policy states that nothing in e-mail is private and that everything is subject to oversight. Such policies should serve as a warning to potential white-collar criminals.

You have to think of e-mail as a broadcasting medium that could reveal all parts of your organization.

So if you have something to hide, don't put it in an e-mail. Better yet, don't have anything to hide. **50169**

DAVID MOSCHELLA

## IT's Day in Political Sun Will Return

**W**HATEVER YOUR political views, the last presidential election cycle must seem like it was from a long-lost era. Remember how Al Gore would rhapsodize about the glories of the coming "information superhighway" and then josh about whether he had invented the Internet? Then there was all that half-facetious talk about a "Gore and Doerr" ticket, as in John Doerr, the venture capital

superstar from Silicon Valley. The Gore vs. Bush race was often portrayed as one between the spaceman of the digital future and the cowboy from the oil-driven past.

Of course, by November 2000, the smart money already knew that the dot-com bubble had been pricked some six months earlier. But the media and most of the electorate had not yet caught on, and thus companies such as WorldCom, Enron and many of the dot-com highfliers were still seen as the harbingers of a bright new American future, and the endorsements and donations of leading high-tech CEOs were considered important coups, even newsworthy events.

Back then, we were all supposed to worry about how to close the growing digital divide. Many thought that government action was needed to ensure that Internet access was a fixture in every classroom and available in every home and that rural residents weren't left behind by greedy broadband pro-



DAVID MOSCHELLA is global research director at CSC Research and Advisory Services, a Computer Sciences Corp. company. Contact him at [dmoschella@earthlink.net](mailto:dmoschella@earthlink.net).

viders. We obsessed about the coming high-tech skills shortage and what the labor force of the 21st century should look like. The role of telephone, cable and wireless telecommunications providers was viewed as a top policy area.

Let's just say that things are very different today. This year's race pits two lawyers against two oil men, not one of whom has ever shown any real interest in the IT industry, its promise, its challenges or

its future. The only time the IT industry has been part of the current campaign is when the topic of offshore outsourcing has come up. The quality of that discussion hasn't been inspiring, and it has mercifully faded during the campaign's final stages.

While it's normal for many issues to get knocked off the front page during times of war, the IT industry's lost eminence is particularly striking. Consider how many other topics now clearly resonate more deeply with the broad electorate — health care, gas prices,

global warming, gay marriage, tax policy, even stem-cell research. These days, not even the governor of California goes out of his way to be associated with IT industry concerns.

Just as the IT business has always been characterized by periods of boom and bust, so have the public's perceptions of our business. Thus, it seems safe to say that while the nation's collective sense of the importance of IT went more than a bit insane during the bubble years, during this campaign it has perhaps swung a bit too low.

Will it ever fly high again? The answer is probably yes. Someday, when nanotechnology, biotechnology and RFID become more than just promises, investors, the media and the nation might once again swoon over the power of technology. If they do, the warm words of politicians and pundits will surely follow. 2008 is probably a bit too soon, but by 2012, it could all be very different once again. **50130**

### WANT OUR OPINION?

More columnists and links to archives of previous columns are on our Web site: [www.computerworld.com/columns](http://www.computerworld.com/columns)

## READERS' LETTERS

### Municipal VoIP Was an Easy Decision

**T**HE CITY OF HESPERIA, CALIF., just underwent a VoIP implementation ["VoIP Gaining Ground, Despite Cost Concerns," QuickLink 48828]. We installed Cisco's AVVID at city hall and all remote sites, including our fire and police departments. We were approved funding for this project because our lines were coming in on a Centrex phone system and our voice-mail system had reached the end of its life cycle. The new circuits were provided at lower cost than our data circuits, and we no longer have to pay the standard charge for each individual phone line and usage charges.

We have a little under 300 end users, and based on our initial cost analysis, our old monthly voice and data costs of \$23,000 will be reduced to \$16,000, a cost savings that has already been witnessed within the first month of service. The analysis also detailed a yearly cost, which includes monthly charges as well as equipment maintenance and repair costs. Our yearly costs for the old voice and data services were \$353,000, whereas the

new converged network will average \$248,000. However, the benefits of this network create an avenue for far greater advantages than can be projected, such as response times for service calls, administration overhead, video conferencing capabilities and other emerging technologies.

We understand that VoIP is not mature, but it is the future of communications. And as our city continues to grow, we can expand our communications capabilities to meet our needs. For us, this was an easy decision to make.

**Rick Ochoa**  
IS manager, City of Hesperia,  
[rochoa@cityofhesperia.us](mailto:rochoa@cityofhesperia.us)

### Don't Buy the Hype

**W**ITH THE FRONT-PAGE headline that read "ERP System Doesn't Make Grade in Indiana" [QuickLink 49349], I guess *Computerworld* can join the likes of the *National Enquirer* and maybe even CBS News. The article said that less than 10% of all students eligi-

ble for financial aid at Indiana state universities will be delayed two to three weeks in getting funding after interface problems with lenders. How many SAP installations would have considered such delays a success? This story was better suited to page 14 than Page One.

**Grady J. Abernathy**  
EDI developer, Burleson, Texas

### What's News?

**I** KNOW HEADLINES can be difficult ["Ballmer Bullish on Future, Bearish on Linux," QuickLink 49199], but really — Ballmer bullish? Who'd have thought? And bearish on Linux? Now there's a change!

**Eric Sandel**  
CEO, S.A. Engineering,  
Truckee, Calif.

### Don't Forget Data On Leased Gear

**A**LL OF THE DISCUSSIONS I've seen about data left on old equipment fail to mention computers that are returned at the conclusion of a lease ["Old Computers: An

IT Department Liability That's Costing More," QuickLink 49063]. And for the really paranoid, how about that PC you sent back for repair? When our CAD users' PCs (and servers) are replaced, the solution we prefer is quite simple — we fold the hard drives in half with a break press. Think about it: This data is on a system whose outdated hard drive is practically worthless on the used-equipment market.

**Jim Porter**  
Programmer, The Raymond Corp., Greene, N.Y.

More letters, page 26

**COMPUTERWORLD** welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, *Computerworld*, PO Box 9171, 1 Speen Street, Framingham, Mass. 01701. Fax: (508) 879-4843. E-mail: [letters@computerworld.com](mailto:letters@computerworld.com). Include an address and phone number for immediate verification.

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## READERS' LETTERS

DON TENNANT

## Handicapped Thinki

**T**HREE WEEKS AGO in this space, I mentioned that I had a signed copy of Bill Gates' book *Business @ the Speed of Thought*, and I said I'd auction it off to raise money for The ALS Association. The winning bid was an even \$100, and it came from Steve Jenkins of the M.D. Anderson Cancer Center

in Houston. I know Steve's generosity is greatly appreciated by the association, which is dedicated to finding a cure for ALS, also known as Lou Gehrig's disease, and by my dad, who is one of its victims.

In that same column, I referred to the proclivity of "Linux loonies" to reward anyone who makes a critical comment about



DON TENNANT is editor in chief of Computerworld. You can contact him at don.tennant@computerworld.com.

with a barrage of hate mail.

I was speaking from experience.

Two weeks ago, I wrote a

column in which I

mentioned that I

was speaking from experience.

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## Linux Skeptics And Defenders Have Their Say

**D**ON TENNANT'S COMMENTARY regarding the Linux community's "Handicapped Thinking" [QuickLink 49904] is a valid observation of a segment of that world. I respectfully take exception, however, to the notion that such zealotry is unique. I have read similar flame mail from Windows enthusiasts. I suspect it speaks more to the bombastic style of "conversing" that's unfortunately commonplace in the general culture.

Having cut my teeth on proprietary software development and having managed large software product development efforts before expanding my range to include Linux, I can tell you two things about the Linux community.

First, the engineering discipline of the folks who do foundation work like the Linux kernel and Apache is remarkable and worth study by all software project leaders. As technology projects get larger, more complex and more geographically dispersed, the skills, technology and processes used by the most successful of Linux/open-source providers are highly instructive.

Second, the careful blending of strong configuration management at the back end of the process with an inviting culture for unencumbered

What these people get is that they do so mindlessly defend Linux is no longer just a system of choice for spirited, defiant techies. The operating system is a growing number of companies that are critical, enterprise. So these outdated, hand-picked

copy is signed by Gates, I'll bid a whole dollar." And, he continued, "Seriously, why don't you auction off a boxed Linux [distribution] like Mandrake or SUSE (the less expensive you can get at the same time, do, I'll start the bid at \$100."

That theme echoed by a respondent

Information technologists need to rethink their approach to software engineering and open their minds to how openness can promote improvement in the qualitative and functional capabilities of internal systems and software products, thereby leading to real bottom-line advantages.

We can debate the place and the future of open-source initiatives on a technology-by-technology basis. However, I believe unequivocal success has been achieved by the open-source community in its pioneering of techniques that have produced amazing quality and functional success with small, multilingual teams dispersed throughout the world and operating with extraordinarily lean budgets.

Everything accomplished by the open-source community tends to contradict mainstream thought about how to build systems. Yet the violation of orthodoxies hasn't caused the sky to fall on the open-source effort or those who embrace open-source to meet real business challenges.

There's a story there that needs to be told and, more importantly, understood.

**Mike Corns**  
Vice president, products and services, Lexpar Corp., Staunton, Va., mike\_corns@lexpar.com

**I**AM VERY FAMILIAR with both Linux and Windows, and many of the criticisms and complaints people have about Microsoft have their analogues in Linux. At this stage of the game, either

operating system is going to have its pros and cons. The more we are ready to take a steady, mature look at our computing tools, the better likelihood that all of them will improve. We can then let the market – and not our proselytizing – decide which systems will prevail.

**Kent Manley**  
Fairfax, Va.

**L**INUX HAS ITS PLACE. Windows has its place. Unix has its place. But hate e-mail has no rightful place. Keep telling it like it is, and I'll keep reading.

**Robert Deck**  
Electrical engineer, Naperville, Ill., bobdeck@ieee.org

**T**HE OVERALL FEELING of the article impresses me as a charge that Linux evangelists are wackos hurting the adoption of their favorite operating system. But then I see that Tennant calls Linux "the operating system of choice for a growing number of Fortune 500 companies that are using it to run critical, enterprisewide applications," which is a pretty nice compliment. And from his description of his earlier articles, I draw the conclusion that Tennant has a tendency to try to get a rise out of Linux enthusiasts. So I'm not surprised that he gets quite a bit of e-mail from aggravated Linux enthusiasts. Because I have the impression that he enjoys hateful e-mail from Linux enthusiasts, I'll give him some: Mr. Tennant, you're a ^&\$^%\$&v ^%&%^^& %& %&%!

**Steve Litt**  
Owner, Troubleshooters.com, Orlando, slitt@troubleshooters.com

**O**NE OF THE FIRST THINGS I tell my Windows students is, "Microsoft is a company; Windows is a product. Neither is a religion." Many of those students are then surprised to hear me repeat the mantra in Unix topic courses: "Unix is just an operating system, not a religion." We must learn to use the right tool for the right job at the right time. Thanks for helping to drive home the point to my current crop of future IT workers!

**Dan McAllister**  
President, IT4SOHO LLC, Clearwater, Fla., dan@it4soho.com

**W**HY ARE THERE Linux zealots? With free/open-source software (F/OSS), it's possible, and I dare say

easy, to become part of almost any active project. All it takes is a lot of time and a little dedication. Find a project, subscribe to the developer's mailing list, become part of the conversation, and on occasion, your suggestions may become part of the product. That sense of belonging allows those who are predisposed to zealotry to take negative F/OSS comments personally.

Contributing to this, many people became part of the community after losing important data to a Microsoft Word bug or having to deal with a spyware-riddled system. Most folks blame Microsoft for these issues, and Microsoft makes it easy to do so. So you are hearing from an active group of people, disillusioned by Microsoft, who take negative commentary personally.

I consider myself to have a more balanced view. I don't have as much time on my hands as the zealots, and it takes a little more cajoling to get me to come out and say something. I've been involved in F/OSS for 10 years and Linux for six. Never before have I seen such momentum. Several Linux vendors are coming forward with desktop-ready distributions that don't require in-depth Linux knowledge to install or use. Within the next couple of years, we will see more PCs ship with Linux preinstalled, more hardware vendors supporting Linux at the driver level, and more momentum on ease of use and (my gripe) interproject stability.

Having faced the wrath of those in F/OSS myself, I thank you for continuing to say things that are level-headed and balanced. If somebody were willing to pay me to spend my time writing columns, I would join you!

**Gary Allen Vollink**  
Director, IT, CorVu North America Inc., Minneapolis, gav@corvu.com

**I**HAVE BEEN PROGRAMMING computers since 1970 and have been a mathematician for the past 27 years. In that time, I've seen operating systems come and go, and in the end, each has had its own strengths and weaknesses.

I started with an HP 2000B Time-Shared Basic computer and have also used TOPS-10 (on DECsystem 10s), DOS/360 (on IBM 360s), RSTS and RSX-11M (on PDP-11s), VMS (on VAXes), SCOPE and NOS (on CDC machines), COS (on Crays), OS/370 (on IBM 370s), SunOS, Solaris, BSD-Unix, Ultrix, Irix, VxWorks, CPM, MS-DOS, all Windows variants, Mac OS, Linux and OS X. Yet in all these years, I have never seen the kind of zealous intellectual bigotry that surrounds Linux.

Yes, Windows has many problems, and yes, Microsoft has engaged in what are at the least predatory business tactics. But this notion that anyone who doesn't march in lock step behind the penguin is somehow the satanic spawn of Bill Gates is utterly absurd.

I myself vastly prefer Linux to Windows, but that's only because I have some skill in Unix variants. I'd much rather use VMS than anything else, but that train left the station a long time ago, and they pulled up the tracks.

It borders on embarrassing to enter into discussions with vendors regarding Linux when their Linux experts almost exude a desire to convert someone to the "true religion." I wonder if it's a coincidence that Linux experts are always called "gurus"?

In any event, in another five or 10 years, I am sure I will be using yet another operating system, but the nice thing is that my C++, C and even my Fortran code will still compile, run and keep giving me the right answers. Yikes, I think I just stepped on the Java community's toes!

**Daniel S. Rosen**  
Vice president of engineering, Burbank, Calif.

**T**HANK YOU for the article. I am a staunch open-source software advocate, but I have to admit that when it comes to discussions about Linux being ready for the corporate desktop, Linux users may do more harm than good.

**Micheal Clark**  
IT systems analyst, Philadelphia, Miss.

**I**JUST READ Don Tennant's column on militant Linux supporters, and I couldn't agree more. As a Linux/Microsoft network administrator, I'm continually amazed at the amount of hate that pours forth whenever Microsoft is mentioned in a Slashdot forum. One instance stands out in my mind. Bill Gates had just donated \$20 million to Carnegie Mellon University for a state-of-the-art computer building, to be named after him. Forum members were incensed. How dare he build a computer building when he's done nothing but wreck the industry! Does he think the world is so blind that we won't see this for the Microsoft promotion that it really is? The few moderates who tried to point out that Gates was donating about \$20 million more than the whole forum put together were immediately and viciously toasted in a flame war.

**Daniel M. Lahoff**  
Pittsburgh





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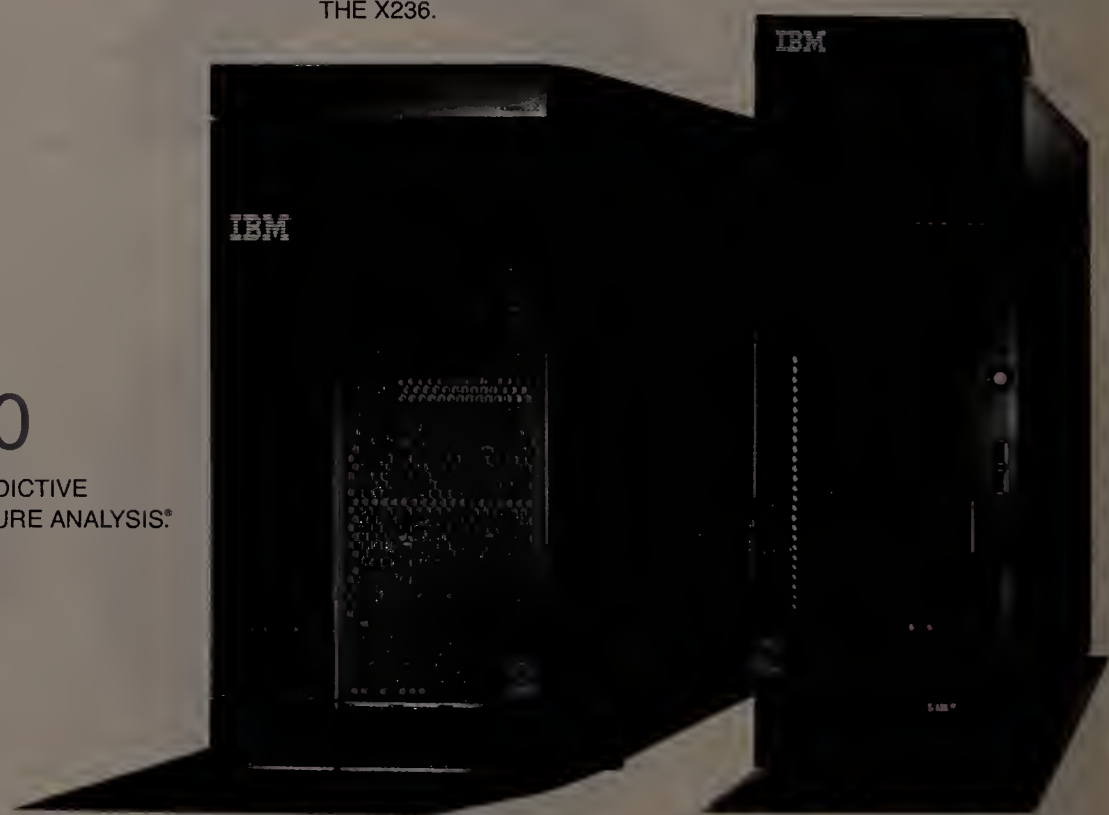
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## FUTURE WATCH Petabyte Prognostications

EDS futurist Jeff Wacker is working with new tools to handle the coming information explosion and to help mobile workers, "the orphans of the information revolution." **Page 42**

## EMERGING TECHNOLOGIES CPUs Rev New Engines

Multicore CPU designs boost performance by putting two or more processing engines on a single chip. The processors should run cooler, faster and more efficiently. **Page 40**

## SECURITY MANAGER'S JOURNAL Sarbanes-Ox Project Following Script

Mathias Thurman and his colleagues have gotten over the hump in their effort to comply with the provisions of the Sarbanes-Oxley Act. **Page 44**

## FIELD REPORT

IN A QUIET CORNER office of Chicago Mercantile Exchange Inc., high above the steady roar of shouting traders on the exchange floor, Joseph Panfil, director of distributed computing, is focused on the smallest increments of time.

There is a direct relationship between system performance and trading volume at the CME, also known as the Merc. By reducing the amount of time it takes to process a trade, trading volume can increase. The more trades there are, the more trading fees the exchange collects.

Time is the bottom-line metric of Panfil's world. "Everything in the trading world is a matter of split seconds," he says.

Panfil is part of a team implementing system changes that have so far reduced round-trip trading times from about 1,800 milliseconds in 1998 to 350 milliseconds today. Five trades can now be conducted in the time it used to take to complete one.

To cut times further and reduce IT costs, the CME is pursuing a major IT overhaul that involves a gradual adoption of the Linux operating system on Intel-based servers while moving off Sun Microsystems Inc.'s Solaris and Sparc hardware. The conversion began about a year ago and is now 30% complete.

## Complex Architecture

The CME's architecture consists of three major technologies: Unix and Linux systems handle the input paths for orders and output paths for quotes. Hewlett-Packard Co. NonStop servers send out order confirmations and quotes. And IBM mainframes are responsible for "clearing," or processing, of all trades.

Traders still work shoulder to shoulder on the CME's floor, but

## The Chicago Mercantile Exchange's Linux Bid

**OBJECTIVE:** Move from proprietary Unix and RISC-based systems to Intel-based servers running Linux in order to cut IT costs and make vendors more price-competitive. Redesign systems to improve performance and reduce trading times.

**CHALLENGES:** Linux support was inferior to that provided for Solaris.

**PAYOFF:** Moving to Intel-based servers and Linux cut the cost for new servers and systems software, and leaner Linux code helped some applications run faster. The Intel/Linux conversion is credited with helping to cut trading times by 100 milliseconds.

ANDY GOODWIN

"Everything in the trading world is a matter of split seconds," says the Merc's Joseph Panfil.

# Exchange Makes Linux Call

BY PATRICK  
THIBODEAU

The Chicago Mercantile Exchange credits its migration to commodity Intel-based servers and Linux with cutting costs and shaving 100 milliseconds off the time required to complete a trade.



since June, the majority of trades have been handled by the Merc's electronic trading system, Globex. The Merc began electronic trading in the early 1990s, using a third-party system to support after-hours trading. In 1998, it introduced its own system.

Customers want reliability and speed in electronic trading environments, says James Krause, the Merc's CIO. Balancing those two priorities means that the exchange, while interested in performance-improving technologies, isn't likely to be the first adopter of a new system. "Whatever we do, we have to make it work right and make sure it's fast," Krause says.

Trading times have been improved by making applications more responsive, upgrading server CPUs and undertaking architectural changes to reduce the number of hops in the path of a trade. For instance, the process previously used to include a disk write, but that has been moved out of the direct path of a trade.

The decision to use Linux and move to fast Intel Corp. chips also led to a reduction in trading time. The Merc credits its Linux deployment with cutting the time it takes to process a trade by about 100 milliseconds to the current 350 milliseconds. The goal is to reduce that to 100 milliseconds. Exchange officials say they believe that using faster Intel chips will bring them halfway toward that goal and that application optimization on the NonStop servers will take care of the rest.

But the Merc's interest in Linux was also sparked by a desire to save money. Leveraging competition among vendors of Intel-based commodity hardware is an important element of this strategy. "One of the things that we were trying to do with Linux is to be totally agnostic and not get tied into a vendor," says Panfil.

Even before the Merc deployed any Linux systems, it had already reduced some costs. "We started using that cost goal against Sun to get them to lower their price and be more competitive," Panfil says. In one case, Sun reduced the price for an \$18,000 two-way UltraSparc server to less than \$10,000. That reduction came "just by having that competitive threat," says Panfil. However, a comparable two-way Intel-based server cost just \$3,000, he notes.

## Preparing for Linux

The Merc had to address several issues before it could deploy Linux. Third-party software had to be approved to run on the operating system and tested



### MIGRATION MILESTONES:

## The Merc's Transition to Intel/Linux Servers

#### FIRST QUARTER, 2002

The CME begins considering Intel/Linux x86 machines as Solaris/Sparc server replacements.

#### FOURTH QUARTER, 2002

Testing begins on HP servers and Red Hat Linux.

#### THIRD/FOURTH QUARTER, 2003

Implementation begins. Trading time is about 500 milliseconds.

#### JULY 2004

Conversion of systems to Intel/Linux servers is 30% completed. Faster servers shave 100 milliseconds off trading times.

#### DECEMBER 2004

About 45% of all Solaris/Sparc servers are scheduled to be replaced with Intel/Linux servers. The Merc hasn't established a final conversion goal but says it isn't aiming for 100% conversion. Some applications will continue to run on Solaris/Sparc systems.

for speed and stability. And the Merc's technical staff also needed training.

There are 19 people in its Unix area, and some were already well versed in Linux. "They were doing this stuff in the basement of their homes. It was good that we had some people on the leading edge," says Panfil. When some Solaris administrators resisted the change, Panfil told them Linux knowledge would broaden their skills. "Why not get that other skill?" he told them. Testing also showed that the Merc

could move some applications off a four-CPU Sparc-based server, replace it with a two-way Intel-based commodity server and not lose any performance. Moreover, the leaner Linux code helped speed up performance on some applications.

When the Merc began considering its Linux deployment more than a year ago, Sun knew it wasn't in a strong position to compete. "We didn't have a good answer for them," acknowledges Glenn Weinberg, vice president of the operating platforms group at Sun.

At the time, Sun didn't have its x86 product line or Solaris running on x86 in "any serious way," Weinberg says. But today, he notes, "those things have both changed." The vendor has made a "tremendous investment" in getting Solaris to run on x86-based machines, and Solaris is outperforming Linux on some financial services applications, Weinberg claims. Sun's x86 line includes Advanced Micro Devices Inc.'s Opteron processors and Intel's Xeon. "We think we're in an increasingly good position there," he says.

CME's goal is to convert 45% of its Solaris systems to Linux by year's end. Originally, the exchange planned to migrate all of its servers off Solaris, but applications on many of the servers are written specifically for Solaris, and it now has no plans to migrate those.

Dan Kusnetzky, an analyst at IDC in Framingham, Mass., says the Solaris kernel may be better tested, more reliable and more scalable than Linux. But he sees Linux, and the freedom it represents, as having powerful appeal to businesses. Whether Sun's late response can counter the threat remains to be seen. "It's going to be difficult to come back and recover that territory," he says.

Still, the Merc isn't closing the door on Solaris. Panfil will continue to evaluate Sun's products, and he says the vendor's planned year-end rollout of Solaris 10, which will run on Opteron processors, could be a viable alternative to Linux. Panfil isn't worried about supporting both operating systems. "We have proven we can support Solaris and Linux in parallel," he says, citing the expertise available on his staff.

The move to commodity-based systems has also made the Merc more aggressive in seeking the best deals. HP is supplying the x86 servers the exchange uses, but Panfil says it could just as easily buy from IBM.

The Merc is unlikely to return to RISC-based servers because Intel boxes have the investment edge, says

Chief Technology Officer Charlie Troxel. "There are huge leaps in performance ability on that side of the space," he says. "The world has gone to commodity hardware, and we might as well be there too."

## Support Headaches

A key issue with the Merc's use of Linux is support. With Sun, Panfil says, the Merc deals with a mature and responsive support organization that will immediately fly out a kernel expert if needed. But he says he thinks the Merc's Linux vendor, Red Hat Inc., needs to improve its support. Currently, he says, Red Hat emphasizes purchasing more products as a way to fix problems. "When there are issues, they need to step up better," Panfil says.

Michael Tiemann, Red Hat's vice president of open-source affairs, says he understands Panfil's concerns; he acknowledges that his company is still learning and says it is making changes.

Tiemann says that Red Hat's goal is to sell products upfront and that the important thing is that when the Merc had problems, they were solved. "Ultimately, Red Hat was able to dig into its technical knowledge and expertise... and help that customer get to the place that they wanted," he says.

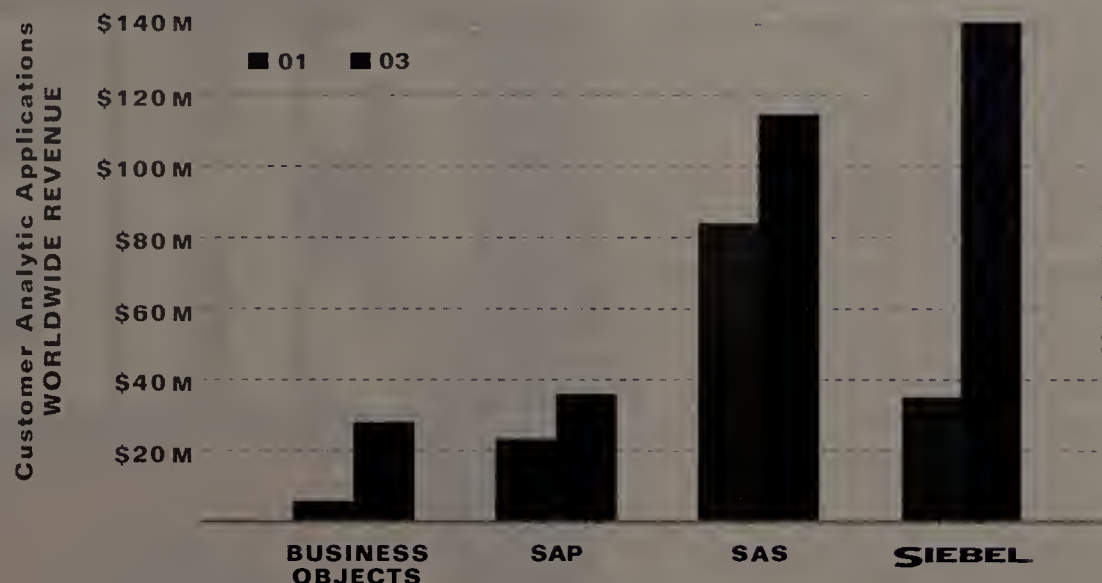
Panfil says the Merc's hands aren't tied by any vendor, and he uses competition to get the terms and support he wants. In particular, he points to Novell Inc.'s acquisition of SUSE Linux AG, which took place after the Merc decided to use Red Hat Linux. The Merc is evaluating SUSE Linux in its labs. "Our threat to a vendor is we can fire you at any time," he says.

The Merc's push also involves building data centers. Last year, it opened a remote facility with sophisticated cooling facilities capable of handling very dense blade servers, if a decision is made to deploy them. The Merc is also using code control and configuration management software from BladeLogic Inc. in Waltham, Mass. The vendor provides the tools needed to create audit trails for compliance with federal laws, says Panfil.

Whether electronic trading replaces noisy traders, or "open outcry," as it's called, remains to be seen, but the infrastructure changes will ensure that the Merc is ready. "If we weren't reliable and weren't as fast as our competitors, we wouldn't see the explosive growth that we have seen in the transition from an open-outcry environment to an electronic trading environment," says Krause. "Our future is electronic trading." **Q 49769**



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As a federal law paving the way for electronic check imaging goes into effect this week, banks are still putting technology in place to make it work. **BY LUCAS MEARIAN**

**T**HIS WEEK, U.S. banks will reach the first mandated milestone on the way to what's arguably the biggest change in the way they process checks since the introduction of magnetic ink character recognition almost a half-century ago.

On Oct. 28, the Check Clearing for the 21st Century Act, or Check 21, will require that banks accept paper documents with check images and data related to transactions in lieu of original paper checks, which, once digitized, can then be destroyed.

The image replacement documents (IRD) will also allow banks to transmit check images electronically, eliminating the need to ship paper checks around the country for clearance and settlement.

The legislation doesn't force financial institutions to exchange IRDs electronically. However, most large banks are already well on their way to upgrading their front-end systems for electronic check-image capture and back-end processing systems in order to take advantage of the efficiencies that electronic IRD processing will create.

Check 21 was proposed to reduce paper handling, collection time, clearing expenses and fraud while improving fund availability and the collection of nonsufficient-fund items. But some institutions have raised concerns about the changes, primarily those related to the high cost of new systems and the increased potential for fraud. For example, IRDs lack security features that are available

*Continued on page 38*

# CHECKPOINT FOR CHECK 21

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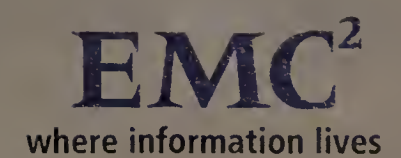
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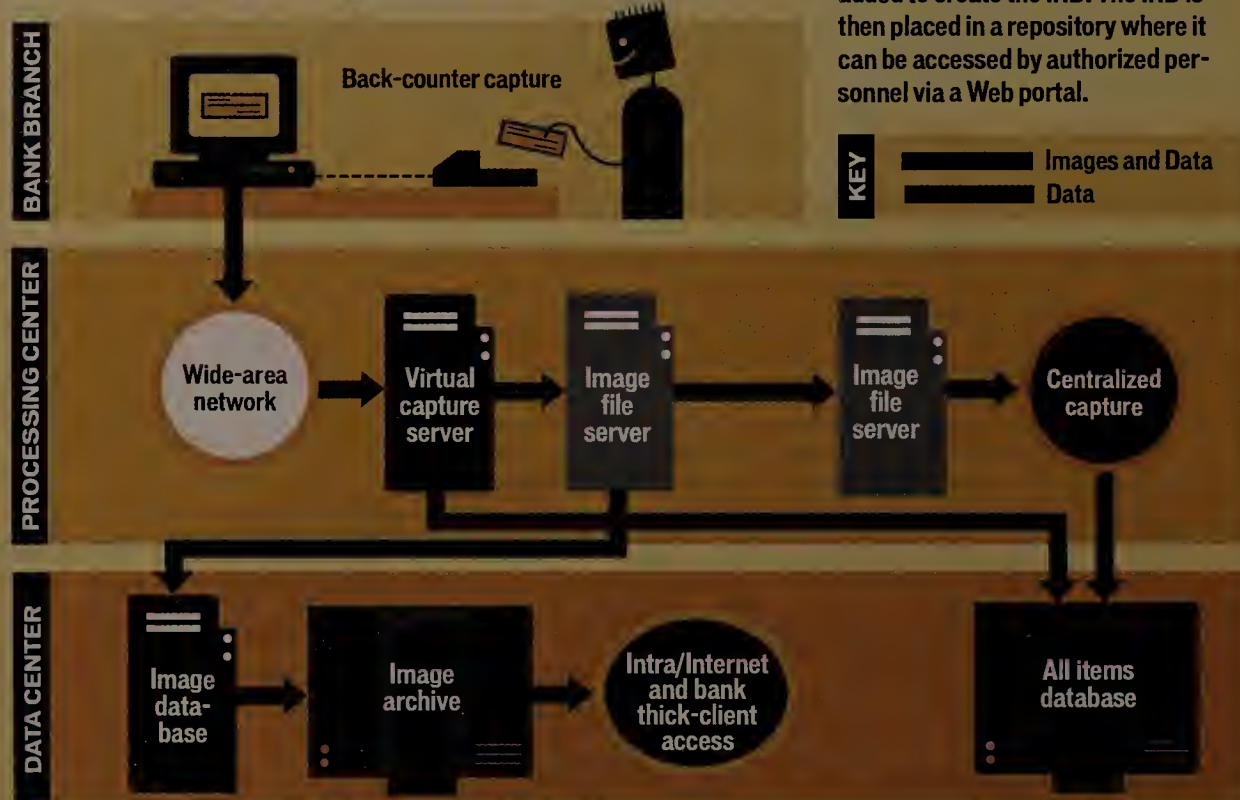


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## CHECK FUNCTIONAL WORKFLOW



This is one possible way of architecting an electronic IRD exchange system. The check image is captured at the teller's station. The image then goes to a server where metadata is added to create the IRD. The IRD is then placed in a repository where it can be accessed by authorized personnel via a Web portal.

Continued from page 34

on paper checks, such as watermarks.

But there's no need for companies to panic because of the impending deadline, say many in the industry involved in orchestrating the transition.

"There are a lot of people who are all gloom and doom about what's going to happen on Oct. 28, but this is an evolutionary process that has got to fit together many pieces," says John Feldman, an image transactions executive in the technology and operations group of Bank of America Corp. in Charlotte, N.C. "I believe it'll be years before the industry reaches image exchange volume."

Bank of America has made investments in check-scanning devices and imaging technology and is evaluating whether to roll out that technology in its branches, automated teller machines and regional check-processing centers, says Feldman.

### Nuts and Bolts

Most of the nation's top 50 banks have made significant investments in imaging technology, experts say, but they have yet to purchase systems to send check images to other banks or integrate back-end systems that will process check images. Individual banks will likely spend anywhere from \$5 million to upgrade imaging software to \$100 million to rip out entire back-end processing systems.

Most back-end bank systems are still mainframe-centric. They are made up of a collection of computers and software that developed over time and in many cases never evolved to handle image exchange, experts say.

There's also a lot of legacy code that needs to be upgraded to make use of the new check images that will be available, says Ed Herman, director of the payments portfolio at Electronic Data Systems Corp.

"There's a collection of back-end systems that would have to be upgraded, integrated, replaced," Herman says. "Over the past 60 or 70 years, [banks have] fine-tuned their paper processing systems. All that is now going to have to change, or at least be integrated differently."

Ted Kute, senior vice president of item processing and treasury management operations at Huntington Bancshares Inc. in Columbus, Ohio, agrees. "There's still a fairly heavy investment in programs that allow banks to retrieve things out of an archive or to find an image of [a check] and develop an IRD file that would be sent out to customers or other banks," he says.

Huntington has already deployed scanners in its three regional processing centers and has its own archive, according to Kute. The bank still needs to purchase software for exchanging images with other banks and equipment for image quality verification and tracking, as well as software for managing image transaction archiving.

"Depending on what information needs to be stored, it could end up being stored in our existing archive, and then we'd have to expand the archive," Kute says. "But when Oct. 28 rolls around, we're going to tell the rest of the world, 'Send us paper-substitute checks.'"

Kute says Huntington has had to make changes to its systems to accept IRDs and to store the additional information in its archives. The bank has also been

preparing to notify customers that it will be using electronic IRDs instead of paper documents for clearance and settlement.

"It's cheaper to transmit a file of images than to deliver the IRDs physically," Kute says. "It's quicker and often more secure and eliminates a lot of the physical handling of the checks. Every time a check changes hands, someone has to run a tape on it."

### Common Standards

Bank of America's Feldman says that banks are at different stages of preparedness for processing check images. He says there are four main technology and business standards areas where banks and check clearinghouses are still lagging. These include enabling image exchange on back-end systems, creating ubiquitous business standards for images, forging multilateral agreements with clearinghouses on exchange standards and devising image quality and usability standards.

"We know we've got to have these standards in place for wholesale or institutional image exchange to take place," says Feldman. "However, we honestly think as image exchange ramps up, we'll be able to leverage technology better than we ever could in the physical environment to do signature recognition [on paper checks]."

Along with J.P. Morgan Chase & Co. and IBM, Bank of America helped found Viewpointe Archive Services LLC, which maintains a database of check images. Bank of America is currently working with Viewpointe on check image quality standards for its ImageShare service, an archive for check imaging and retrieval. New York-based Viewpointe stores 22 billion check images per year.

According to the Banking Administration Institute in Chicago, in June, 42% of all member banks surveyed indicated that they would invest in shared archive applications; 40% said they were going to make additional investments in check imaging technology, such as scanners.

"Probably of all banks in the marketplace, 30% to 40% have already invested in imaging systems," says Peter Soraparu, a spokesman for the institute. Most of the technology for generating the image quality that will meet industry standards is already in place at check-processing organizations and large banks, says Frank Jaffe, project manager for the Financial Services Technology Consortium (FSTC). There will need to be updates for software to measure against standards adopted by the American National Standards Institute, he adds.

The FSTC has recently been working on standards for security features on checks and standards for check-image quality. In the area of quality standards, the consortium is looking at issues such as how many black specks, or how much "noise," an image may contain and still be considered an acceptable document, and whether a dog-eared check is acceptable as an image. These efforts are designed to minimize the risk of disputes.

"Phase 1 is to establish the basic measurements to be standardized, and Phase 2 is to test those against a large sample of images to make sure they're useful," Jaffe says.

Jim Lowe, a systems engineer at Plano, Texas-based EDS, which sells paper and electronic check ex-



change services, says banks must be prepared to create an electronic image file using a standard format so that it can be exchanged with another bank or clearinghouse. Currently, however, there are many formats.

"It's likely to come down to a handful of standards," Lowe says.

The top 22 banks in the country are all co-owners of the New York-based Small Value Payments Co., which is focusing on check-imaging technology and setting up a national network and switching center to manage the exchange of check images.

The Electronic Check Clearing House Organization, a Dallas-based, not-for-profit company that's owned by 24 banks, has created a set of rules that cover issues such as electronic check presentment, returned checks and guarantees between banks when exchanging images. Small Value Payments has licensed the rules for use by its customers. But not all banks have signed onto joint image-exchange ventures.

### In-house Expenses

While Check 21 will bring immediate benefits, financial institutions also face some expenses preparing for it. The cost of deploying check-imaging software to process checks for clearance and settlement can range from \$4 million to \$6 million for a large bank, according to Viewpointe.

Feldman declines to discuss costs but says Bank of America continues to buy more direct-attached storage and tape archiving systems to handle check-image storage but is also migrating away from labor-intensive microfiche.

"Data storage is something we'll continue to add up until we are able to satisfy our retention requirement, which is seven years," Feldman says.

## The Great (POTENTIAL) Transformation

There's still a long way to go before most financial institutions are ready to process checks by exchanging images.

### BEFORE CHECK 21

- Processing a paper check involved transportation and capture at several locations.
- Each step in the process added time and increased fraud risk.
- The entire process typically took two to three days.

### THE PROMISE OF CHECK 21

- When the automated, electronic system becomes a reality, a receiving bank can scan a check once and use that image to complete the clearance process.
- Banks can create secure database repositories in which the check images are stored.
- Those images can then be accessed through secure, Web-based channels.

While Bank of America already has check-imaging systems that allow customers to view checks online, it doesn't yet have check clearing and settlement systems to process the more than 8 billion checks it handles each year. Feldman says the bank will be able to send IRD images from commercial clients by the fourth quarter, and it will be able to receive images by the end of the first quarter of 2005. "We've somewhat staged our Check 21 rollout," he says.

Like other banks, Bank of America must decide

where to capture check images. This can be done at the teller counter, at the ATM or in processing centers. The bank is still investigating all three options.

"Then you always have the integration risk from the old to the new systems," Feldman says, meaning that banks will have to consider migrating data from legacy systems to new computers.

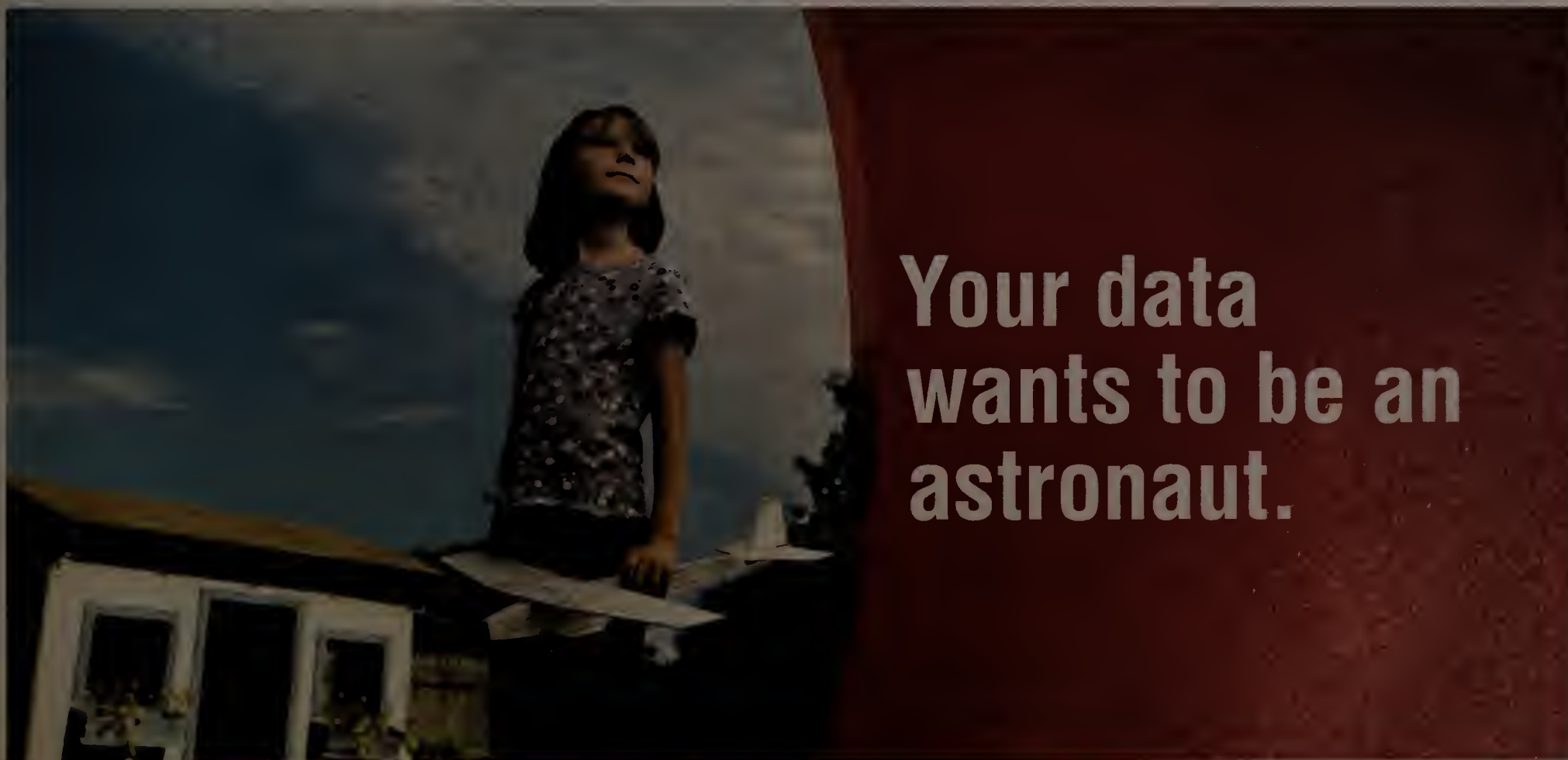
Soraparu says that while there may be some short-term expenses associated with Check 21, the efficiencies will increase over time.

"Larger banks thought the immediate impacts would be minimal," says Soraparu. "While there would be infrastructure expense in the short term, the efficiency benefits would kick in over time."

Kute says Huntington Bancshares has been doing check imaging for its customers for the past eight years, but it isn't yet prepared to do image exchange with other banks. "We're doing the coding and making the changes in our systems that are required to be able to handle this new document being presented on Oct. 28," he says. "We're also making decisions on how we'll present that image to our customers in the form of online banking and in their statements."

Until the entire banking industry embraces electronic IRD exchange, back offices will have to continue to process both paper checks and images, which incurs additional cost.

"You read some articles saying Check 21 is the biggest nonevent since Y2k, and you read others saying we're going to save \$2 billion a year. Both are accurate statements: One is accurate on Oct. 28, and the other is accurate for three to five years down the road," Feldman says. "This is going to be something that ramps up over time. The key is that this isn't a conversion; it's a migration. The key is getting industry adoption to be widespread." **Q 49836**



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# CPU'S

## Rev New Engines

**OUTLOOK:** Emerging dual-core CPU designs boost performance by putting two or more processing engines on a single chip. The processors should run cooler, faster and more efficiently. But per-processor licensing fees may boost costs. **By Gary H. Anthes**

### EMERGING TECHNOLOGIES

IN 1969, INTEL CORP. introduced its first microprocessor chip, the 4004. The 4-bit processor chugged along at a mere 104 KHz. In the 35 years since then, processor clock speeds — and performance — have doubled about every 18 months.

Today, however, it's becoming more difficult and expensive to boost the speed of processors while keeping them cool. Chip designers use many techniques to wring more throughput from a processor chip without increasing its clock rate. Those techniques include multithreading, instruction-branch prediction and clever uses of cache. But the most promising approach is to put more than one processing engine on a chip.

In 2001, IBM introduced the first mainstream "dual-core" chip, the Power4, for its IBM eServer pSeries and iSeries servers. Early this year,

Sun Microsystems Inc. shipped its UltraSparc IV with two cores for its Sun Fire V series servers, and Hewlett-Packard Co. unveiled its own dual-core

PA-RISC 8800 processor. Advanced Micro Devices Inc. responded last summer by demonstrating an x86-based, 64-bit, dual-core Opteron processor. Intel Corp. subsequently announced plans to ship its Itanium 2-based, dual-core Montecito CPU in 2005.

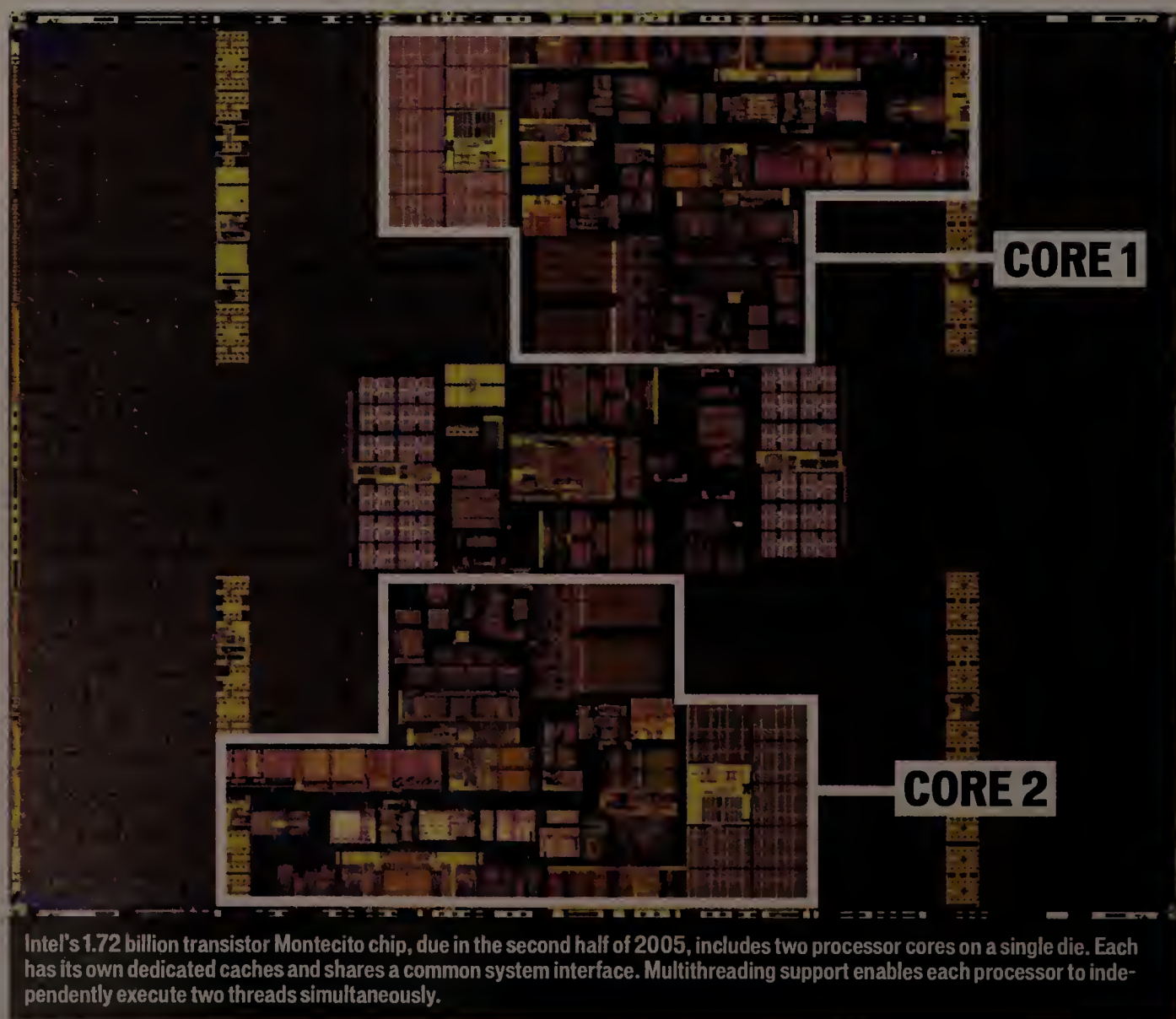
The chip makers say that within two years, most processor chips — from desktop systems on up — will have two or more processing units. The reasons for this are compelling. A dual-core chip might provide twice the performance of a single-core chip at a much lower cost than two single-core chips can. Communication between two processors is faster when they're on one chip, and cache sharing can make processing more efficient. Dual-core processors also use less space, consume less power and generate less heat than separate processors do.

### Reality Check

Vendors claim that multicore chips are well suited for transaction processing and for database and scientific applications.

"It's probably fair to say that the realistic range is 40% to 80% faster," says Kevin Krewell, editor in chief of the "Microprocessor Report" newsletter and an analyst at In-Stat/MDR in San Jose. They're less effective on single-application machines and for applications whose instructions can't be broken into parallel streams, he adds.

While the number of transistors on



Intel's 1.72 billion transistor Montecito chip, due in the second half of 2005, includes two processor cores on a single die. Each has its own dedicated caches and shares a common system interface. Multithreading support enables each processor to independently execute two threads simultaneously.



## Multicore Evolution: A Timeline

CHIP	NUMBER OF CORES	SHIP DATE
IBM Power4	2	2001
Sun UltraSparc IV	2	2004
HP PA-RISC 8800	2	2004
AMD dual-core Opteron	2	2005
Intel Montecito	2	2005
Sun Niagara	8	2006

a chip is still doubling every 18 months, how that extra capacity is used is about to change. "This is the end of the clock-speed race," Krewell says. "As more transistors are available, do you go for higher instructions per cycle? Most people think we have come close to the limit of what can be done there." So those extra transistors are used to build another processing engine — and to enable multithreading, in which multiple instruction streams, or threads, execute in parallel. Indeed, earlier this month, Intel scrapped its plan to boost the speed of its Pentium 4 chip from 3.6 GHz to 4 GHz in favor of enlarging on-chip cache.

Vendors are working on designs that go beyond two cores, but they face a few challenges. First, at current semi-

conductor circuit sizes of 130 and 90 nanometers, putting more than two cores on a chip is difficult. But chips with four or more cores will become common as the industry moves to 65 nm technology.

Sun is already working on a multicore chip. The 90 nm Niagara chip, due in 2006, will support Solaris and hold eight cores. Niagara is intended to be "Web-facing, the first tier in the server room," where it might, for example, handle 32 user searches at once, says Marc Tremblay, a chief architect for processors at Sun.

Another problem with multicore chips is software, says Krewell. To use that many processors efficiently in one die, the operating system must perform a fair amount of work. "Windows

XP scales reasonably well in four-way and eight-way systems, but it's not going to apply so well to 16- or 32-way systems," he says.

And even with dual-core processors, software licensing issues could trip up early adopters, says Krewell. Many vendors license software by the processor. Until now, each generation of CPU chips has increased processor clock speeds, often doubling performance without affecting software costs. If the next generation doubles performance by adding a second processor core, software licensing costs could double as well. (To see how Oracle and Microsoft have responded, see QuickLinks 50053 and 50178.)

As dual-core processor chips become the norm over the next two years, software vendors' attempts to charge per core could backfire, says Krewell. "Does it make open-source software, like MySQL, more attractive, and does it cause a shift in corporate buying to open-source packages that are much more flexibly priced?" he asks. That's a question users are likely to answer over the next 24 months.

🔗 49887

### SOFTWARE WOES

Per-CPU license agreements could create unexpected costs for dual-core systems:

🔗 QuickLink 49885  
www.computerworld.com

#### AT A GLANCE

## Multicore Processor Chips

### What are they?

Silicon chips with more than one processing unit, each often able to run multiple threads of instructions and each often having its own on-chip cache.

### What's the benefit?

The chips offer the performance of multiple processors but cost less, take up less space and consume less power than multiple single-core designs.

### Best application

Target applications include transaction processing, and database and scientific applications.

### Caveat

Multicore processors offer fewer benefits for machines running a single application or for software that won't allow execution of instructions in parallel. You'll save on hardware costs but could pay more in software licensing costs.



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# Petabyte PROGNOSTICATIONS

EDS's futurist is preparing for the coming data flood with context-sensitive text-mining tools.

BY GARY H. ANTHERS

*Jeff Wacker's job as Electronic Data Systems Corp.'s futurist is to develop companywide initiatives that will shape the future of EDS. He recently told Computerworld's Gary H. Antner why mobile workers, unstructured information and communications infrastructures are worthy of special attention in the coming years.*

**Is there an information explosion coming?**  
Yes, and it's based on two major factors. First, there's all this sensor and RFID in-

## FUTURE WATCH

formation that's starting to flow into corporations, and it will only accelerate; Wal-Mart is looking at 5TB to 7TB a day. The other factor is that unstructured information makes up 80% to 90% of the average corporation's information content. It's not in a form computers can readily use, such as e-mail. We are using context-sensitive text mining as a tool for structuring that content. When you do that, all that information becomes a corporate asset.

**How might that new asset be used?** Most of

the new information that allows you to predict the future is nontraditional corporate information — what we call indicator information. You have transactions, which are past; you have events, which are current; and you have indicators, which are not traditionally used in business. You can put that information in a data mine and after the fact try to figure out what you should have done. Or you can feed it into a cause-and-effect model . . . and use pattern-recognition technology. [That gives you] the ability to understand patterns of business activity that are going to repeat and say, "What do I want the outcome to be?"

**Can you give a couple of examples?** Weather predictions for a warmer-than-usual winter in New England change the model's probability of selling *x* fruitcakes to *y*. That, coupled with a colder-than-normal forecast for the mid-Atlantic states, drives a directive to channel the fruitcake to those states.

Or an erroneous newspaper article reports that a certain food product has now been linked to heart attacks. In every city where that article has appeared, you can expect the demand to fall off precipitously, and therefore you need to "reverse-logistic" the existing supplies of the product to areas where the article has not run.

**What are some opportunities for IT in the mobile world?** Mobile workers are the orphans of the information revolution, because IT has basically ensconced itself in a stationary environment. Mobile workers work asynchronously with their IT. The office worker works the problem with the computer, but the mobile workers for the most part get their information, go out and do their work, come back and report their information. The IT is not overlaid directly on top of their work.

We have built a testbed called process mentor. It's the ability for you to deliver just-in-time information to the mobile worker. Information flows, unprompted in some cases, as you need it.

**Can you give an example?** In the petrole-

um industry, 70% of workers are in the field. The average age of a field worker is 55, and 50% of them will retire in the next five years. That's a hell of a lot of expertise not easily replaced. So if I'm out at the wellhead and I ask, "How do I take this thing apart?" all of a sudden I have just-in-time training that tells me exactly how to do it. It says, "Here's Step 1 — now do it. Now here's Step 2 — do it," and so on. It's the opportunity to put IT into the business process rather than work around the business process.

**Where will we see sensors deployed?** That airplane that's flying has sensors that tell me that a certain part is going to go out, so I can fly the part to the destination before the plane gets there. That's the kind of model that's going to be deployed throughout all of business. All

the items coming into my supply chain, all the items going through manufacturing, all items going out to the customer and all the people in my organization are going to be sending me information.

**All that extra data must have huge implications for storage systems.**

When we start sending petabytes of information from one company to another, it's cheaper to have a petabyte storage

cube put on an airplane and fly it to the other coast. That will be a constraint in the future, because petabytes of information don't work well on our communications infrastructure.

**What's the solution to that problem?** The amount of information that can be stored on a hard drive doubles every year . . . and fiber-optic capacity is doubling every nine months. While it will take some time, this will overcome the problem.

Also, you can break the file into many pieces, transmit the pieces and put it all together on the other end. The problem here is the infamous last mile. Most companies do not have [networks] to allow them to send the data through multiple pipes from a single source and to a single destination. This is an infrastructure design problem that never contemplated needing many T3s to the same point of origination/delivery. **49724**

## Jeff Wacker

**TITLE:** EDS fellow and futurist

**COMPANY:** Electronic Data Systems Corp.

**BAC GROUND:** Wacker is chief technology officer for EDS's Global Industry groups. He earned a bachelor's degree in computer science and an MBA from the University of Nebraska. He is a member of MIT's Society of Learning.





# Master of the Mainframe

IBM's Jim Rhyne talks about the future of big iron in the age of Web services

*Jim Rhyne, an IBM distinguished engineer, is the company's lead architect for non-Java application development tools and CICS, IBM's enduring mainframe transaction-processing middleware, which recently celebrated its 35th birthday. As part of his job, Rhyne works with customers to modernize their old mainframe environments. He spoke with Computerworld's Robert L. Mitchell about CICS, Web services and the future of the mainframe.*

**IBM's CICS transaction-processing middleware is now 35 years old. What is its future?**

At the beginning, CICS was a very crude set of libraries built for what was then the IBM 360 operating system. Over the years, it has matured from a programming library into something that's strikingly similar to what we have in WebSphere today. It provides application containers that not only support transaction behavior but resource management. It supports scale-out.

It's going to remain as a high-end, high-speed, high-throughput atomic

transaction-processing system. You'll find WebSphere taking over the low end of the transaction-processing marketplace and much of the middle as well. [CICS] is going to be a full player in this on-demand integrated computing environment that IBM is promoting. You'll find aggregations of software designed to handle Web browsers, designed to handle external interactions mediated by Web services. Behind that will be transaction-processing databases, and we expect CICS to be one of the premier solutions that we offer.

**What emerging technologies are affecting CICS and mainframes?** XML and Web services, service-oriented architectures — this is the big thing that's hitting the mainframe. If you look at the composition of SOA, there is a universal connectivity part, then there is

componentization — taking monolithic applications and breaking them down into reusable chunks of business logic. That was easy to apply to user interface and client-side programming. Now we're getting around to using it in a serious way on the server side.

**How do you bridge mainframes with Web services?** The integration software [for CICS] is going to be J2EE and Java. CICS applications change, and when they do, there's an outward ripple into the WebSphere environment.

From a development point of view, if I make a change to a CICS application, it's not easy to find and change the corresponding set of WebSphere applications that use it. What you have is a mixed workload application. From a management point of view, I want to manage this as a single entity. The most important thing [programmers] can do is to understand the other technologies you have to interface with. It's

**JIM RHYNE**  
Lead architect for  
non-Java application  
development tools  
and CICS at IBM



a lot easier for these communities to operate as teams if they understand each other's technologies.

**Where will the mainframe be in five years?**


It's difficult to predict. Part of the reason is that on hardware, we seem to be approaching a discontinuity. For years, we've had a Moore's Law, given that machines consume less power and they run faster [as time goes on]. Well, we're getting close to the end now.

At that point in time, if you look at how you are going to meet the demands for computing, the only option left is to go into large-scale multiprocessing — thousands of parallel processors, or even tens of thousands — instead of the few dozen we have today.

My guess is mainframe applications will have to undergo a substantial amount of change because they were built essentially as single-threaded software. The mainframe will be hit by this, a lot of the Unix applications will be hit by this, and the Mac OS and Windows are also going to be hit by this. It will be a big game-changer, and my [crystal] ball is pretty cloudy about what's going to happen. **50047**

## MORE RHYNE ONLINE

For more of Jim Rhyne's views on the changing computing landscape, visit our Web site:

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[www.computerworld.com](http://www.computerworld.com)

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# Sarb-Ox Project Following Script

As the deadline for compliance with the financial accountability act approaches, systems testing is coming along.

By Mathias Thurman

**I** CONTINUE to get a significant amount of e-mail asking about the Sarbanes-Oxley Act, so I thought I would provide an update on our progress toward compliance. Since the last time I commented on this subject [QuickLink 48412], we have come quite a ways.

A few months ago, I attended a meeting with representatives from networking, data center operations, database and application engineering, Unix and Windows NT administration and other groups to discuss control objectives for each area.

We mainly used Cobit (Control Objectives for Information and Related Technology) to help identify our controls. It provides a framework, guidelines and some implementation tools to steer companies in the right direction.

## Finding Our Focus

We also needed to think about which systems would have to be looked at. Our company has over 500 production Unix servers and several hundred NT servers running various applications. There was no way we could test over 700 servers. Since Sarbanes-Oxley focuses on financials, we came up with a list of systems that affect our financial reporting. Those 700-plus servers dwindled to just under 100. We then categorized them by application to better manage the workload.

Once we formalized the objectives, the testing was fairly straightforward. For example, one control objective within

the Oracle database area might say, "Users do not directly access the Oracle database using the application ID or a generic account." Certain parameters within the Oracle database configuration file, as well as the Unix user accounts, would have to be reviewed to determine who had access to the server and the

database. Given that we have dozens of Oracle servers in our environment and 32 tests to perform, it made sense to run a script on each server that

would obtain the information from configuration files.

For Oracle, most of the test results were within either the init.ora or the listener.ora file. The script took some time to develop, but in the end, we had an easily repeatable method for testing our Oracle environment.

For the Unix servers, a control objective might be, "User passwords must be changed every 90 days." The test for this objective would

be to review the /etc/default/passwd file for every Unix server and see if the "MAX-WEEKS" parameter was set to 90 days. With over 25 control objectives for the Unix environment and dozens of servers to test, we developed another script. Tests included grabbing configuration files, checking file permissions, listing patches and installed applications, and running commands to obtain system information.

We'll have to repeat this process every year, so it's imperative that we come up with a standardized method to test our control objectives. Scripts are one method of ensuring that we're consistent.

## Tracking Our Work

To keep track of our work, we developed standardized spreadsheets for each IT control area. For each control objective, we identified the implication of a particular objective not being satisfied, the testing procedure and recommendations if it failed. We also included a column to register test results.

After the testing was completed, each person responsible for an area of testing created what we called "gap sheets," which identified failed control objectives. The managers then met to go over the gap sheets and plan for fixing the gap or determining what are termed "compensating controls."

In the test for password expiration, for example, compensating controls might be that users are forced to use SecurID two-factor authentication to access Unix servers and that the system is locked down to prevent users from directly logging in via their user accounts. Compensating controls have to be used carefully,

though, since auditors could suggest that we're making excuses for not doing the work needed to make the system modifications.

Although I've mentioned only the Oracle and Unix areas, several others were identified in relation to IT security. For example, incident response, security policies, log monitoring, intrusion detection and encryption have their own control objectives. Unfortunately, because I represent the security department, I was restricted from performing the security tests, since it could be argued that I'm biased.

We have completed our testing and are working hard to retrofit our systems, procedures and policies to comply with the identified control objectives. We're finding that we can't just arbitrarily make changes to satisfy a Sarbanes-Oxley test objective, especially in a production environment that generates thousands of dollars per minute in revenue.

For example, if an objective was to ensure that only necessary applications were installed, the response might be to remove unnecessary applications. Sometimes, by removing an application, associated system libraries also get removed, which may affect other applications or general system operation. Unfortunately, we don't have a robust development environment that directly mirrors our production systems, so we can't easily test such things ahead of time.

Changing our environment to meet the control objectives will be very time-consuming, frustrating and critical for our company. In December, the official audit will take place, and we're fairly confident that if we're tested according to the current control objectives, we'll do fine. ■

## WHAT DO YOU THINK?

This week's journal is written by a real security manager, "Mathias Thurman," whose name and employer have been disguised for obvious reasons. Contact him at mathias\_thurman@yahoo.com, or join the discussion in our forum: [QuickLink a1590](#)

To find a complete archive of our Security Manager's Journals, go online to [computerworld.com/secjournal](#)

## SECURITY LOG

### Security Bookshelf

■ **Wi-Foo: The Secrets of Wireless Hacking**, by Andrew Vladimirov, Konstantin V. Gavrilenko and Andrei A. Mikhailovsky; Addison-Wesley Professional, 2004.

If you're looking for a comprehensive technical reference on wireless security, then you'll want this 550-page book, which provides a wealth of knowledge on almost every aspect of wireless security. Despite a fairly dry and somewhat confusing chapter on applied cryptography, the book is packed with tools, techniques and other forms of exploits that can be leveraged against a variety of wireless networks. Not only do the authors provide methods for exploiting the wireless environment, but they also describe defensive techniques for preventing or detecting the exploits.

— Mathias Thurman

## Short Takes

**COMPUTER ASSOCIATES INTERNATIONAL INC.** last week announced eTrust Security Command Center r8 for monitoring and managing all aspects of enterprise security, from threat discovery through resolution, in real time. New features include out-of-the-box correlation tools, Web-based update services, advanced incident management functions and customizable "work spaces" designed for tasks such as comparing an organization's security posture against the standards set by the SANS Institute. Pricing was unavailable. . . . **SILEX TECHNOLOGY INC.** has unveiled the Combo-Mini, a USB biometrics reader for use with laptops and PCs. The \$179 device stores metadata about fingerprints and works with a user identity module card and password identification. The Combo-Mini also supports cryptology.



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“

**It's imperative that we come up with a standardized method to test our control objectives. Scripts are one method.**

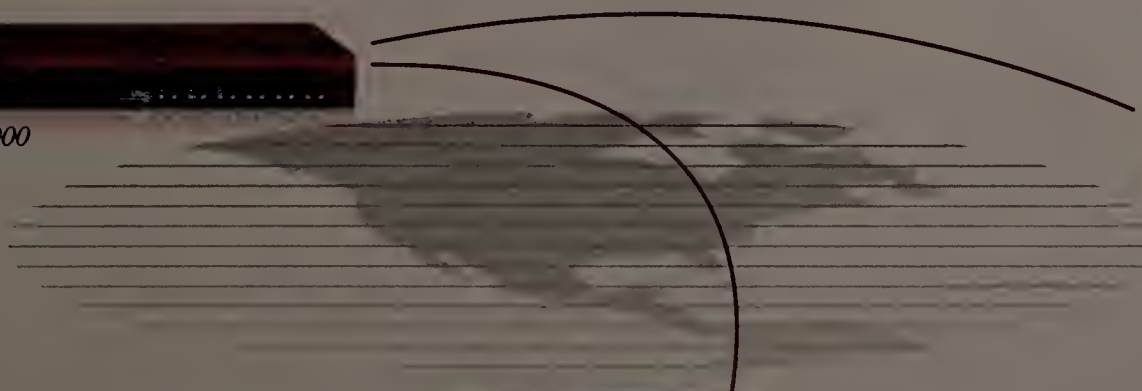


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## BRIEFS

## Copernic Upgrades Desktop Search

■ Copernic Technologies Inc. has released Version 1.1 of Copernic Desktop Search, which features faster scanning of Microsoft Outlook e-mails, improved computer resource usage monitoring, customizable scheduled indexing and the ability to use multiple windows for queries, said the Canada-based company. The free download is available at the company's Web site, [www.copernic.com](http://www.copernic.com), and works with Windows 98/ME/NT/2000/XP and Internet Explorer 5.0 or later.

## Aten Announces Eight-Port Switch

■ Aten Technology Inc. in Irvine, Calif., last week announced the KH88, an eight-port switch for remote keyboard, video and mouse connections between eight computers. The switch provides the ability to cascade from any port and controls for 512 computers from a single console. The KH88 is priced at \$449.95.

## Adaptec Releases Data Replicator

■ Adaptec Inc. in Milpitas, Calif., has announced the availability of Snap Enterprise Data Replicator. The software offers automated data movement from multiple remote sites to a central location, Adaptec said. Snap EDR pricing starts at \$2,699 per server.

## SeeBeyond Ports Components to Sun

■ SeeBeyond Technology Corp. last week said it will port components of its Integration Composite Application Network Suite to Sun Microsystems Inc.'s Java Enterprise System, starting with its eGate Integrator 5 to Sun's Java System Application Server 8. The companies also plan joint offerings around Sun's Java System Portal Server and SeeBeyond's ICAN 5 integration server.

DANIEL J. WEITZNER

## Openness as a Privacy Protection Strategy

**T**HE CHALLENGE that new computer, network and sensor technologies pose for privacy is now beyond dispute. At the forefront of social, legal and business struggles over defining privacy in an age of increasing exposure of personal information is the transparent enterprise.

As I discussed in two earlier columns [QuickLinks 48574 and 49552], our enterprises are increasingly transparent. We see growing linkages among previously stovepiped databases. Web services and semantic Web technology will connect information stores of partners that span enterprise boundaries, and our networks are connected though mobile infrastructures that reveal not just who's online but their physical locations.

All of this means that we're collecting orders of magnitude more information and have the power to do much more with it than ever before. So, the privacy challenge in the age of transparency is, How do we respect the privacy expectations of our customers and employees while taking advantage of critical new data-integration capabilities available to us?

Perhaps the only way to protect privacy is through greater exposure of personal information. After thousands of years of code-making, cryptographers learned that security by obscurity is no security at all. While there are important differences between security and privacy, could it be that privacy by obscurity is about to go the way of security by obscurity? CIOs, privacy officers and others who worry about the public policy implications ought to pay attention to transparency design strategies as cornerstones of privacy.

Three technical phenomena should encourage system design-



DANIEL J. WEITZNER is technology and society domain lead at the World Wide Web Consortium and principal research scientist at the MIT Computer Science and Artificial Intelligence Laboratory. The opinions expressed are his alone. He can be reached at [djweitzner@csail.mit.edu](mailto:djweitzner@csail.mit.edu).

ers to rethink their approach to privacy protection: first, the gradual demise of stovepiped applications in favor of enterprisewide data integration; second, the rapidly declining cost of Web-scale query; and third, the rapid spread of sensor networks in public and private settings. The dramatic privacy impact of cheap, Web-scale data integration is visible today through the operation of systems such as credit card fraud-detection networks, vehicle guidance and telemetry systems, transponder-based toll-collection systems that also seem to

monitor traffic flow, and the proximity cards tied to individual identity that are increasingly common in office buildings.

Science fiction author David Brin is best known for suggesting that we embrace transparency. His proposal has been treated with considerable skepticism in the privacy community. Fundamental changes in the technology we adopt, as well as limitations in privacy protection regulations, compel us to take a more careful look at what transparency has to offer. We must not conclude that privacy has been somehow superseded by 21st century IT. Indeed, the increased data collection and inferencing power in today's information environments makes support for fundamental privacy values all the more important.

Is the transparent enterprise destined to be the engine of the elimination of privacy? Has the analytic power and data-gathering

reach of today's information networks rendered privacy a disappearing artifact of simpler, less-networked times? I don't believe so, but in order to retain the dignity, control and occasional solitude that are at the heart of privacy, we have to start designing systems differently.

First, we should embrace transparency as a design philosophy that can help people ensure that information about them isn't used in a way that's contrary to legally permissible purposes or in violation of agreements under which it was collected. Our design goal should be to provide active transparency to users. In many cases, people are comfortable about information collection, provided they know that it's happening, understand the purpose of it and can check that it's not being used inappropriately.

Second, protecting privacy in an increasingly transparent society will be possible only with privacy laws that reflect the great expansion of data collection and inferencing capabilities. It's always better to delete personal information that's no longer needed (or shouldn't have been collected in the first place). However, we have to face the fact that there are mounting reasons to collect more and more information about people.

Finally, living with transparency will be a challenge. We aren't likely to get either legal or technical measures right the first time. Hence, we must devote resources to a wise and sustained dialogue among regulators, the citizenry and technical designers.

This is the transparency paradox: Amid the explosion of the collection of personal information, privacy protection requires that we embrace the transparency of information systems in order to ensure that information is used properly. Giving people a window into the information collected about them, and control over its use, can help put the transparent enterprise on the right side of privacy protection. **50163**

## WANT OUR OPINION?

For more columns and links to our archives, go to [www.computerworld.com/opinions](http://www.computerworld.com/opinions)

This is the third in a three-part series of columns on the transparent enterprise.





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## COMPUTERWORLD SALARY SURVEY 2004

AFTER WORKING at a large Midwestern manufacturing company for 22 years, a senior IT design analyst understood that times were tough for her firm, so she didn't complain about the 2% raise she got in 2003. But this year her empathy turned to irritation when her performance improved but her salary didn't.

"When you consider that I get an above-average review and get just a 3% raise [this year] — it doesn't make up for the crappy year before that," she says. "They are assuming that I'm going to keep working hard anyway. But there's no carrot. The carrot's gone."

She's not alone. For the third year in a row, IT workers across the board received only modest raises — their pay increased by an average of just 3% in 2004, according to *Computerworld's* 18th Annual Salary Survey, which studied the compensation and bonuses of 9,854 IT workers.

Although the average IT pay raise is slightly higher than last year's figure of 2.8%, it's still lower than the national average of 4% that the Bureau of Labor Statistics reports for all U.S. workers. While the majority of respondents (65%) said their 2004 base salary increased from one year ago, 35% experienced either no change in salary or had their pay cut. Meanwhile bonuses are back — but up only 1% on average. Most IT workers (70%) said they expect no change in their 2004 bonus compensation from one year ago.

What's more, on-the-job stress is at an all-time high, according to the survey. Some 88% of respondents reported feeling stress because of budget cuts and increased workloads, up from 82% last year. One quarter of IT workers surveyed said they're dissatisfied with their pay when considering all their job responsibilities, while another 24% reported that they're neither satisfied nor dissatisfied with their pay.

Have IT employees reached the boiling point when it comes to pay? Not yet, survey takers said, but they're getting close.

An IT security strategist, who spoke on the condition of anonymity, has survived outsourcing, reorganization and a tough economy in his 15 years at a financial services company. For him, a meager raise beats the alternatives. "I feel lucky to have survived that rapid loss of business and that slow recovery of it. I'm happy to still be working," he says.

"I think that people are happy to have a job

POLLY BECKER



# Boiling Point

NEARING THE

IT WORKERS SIMMER OVER THIRD YEAR OF LACKLUSTER RAISES, BUT THEY'RE NOT READY TO BLOW - YET. BY STACY COLLETT

ONLINE EXCLUSIVE

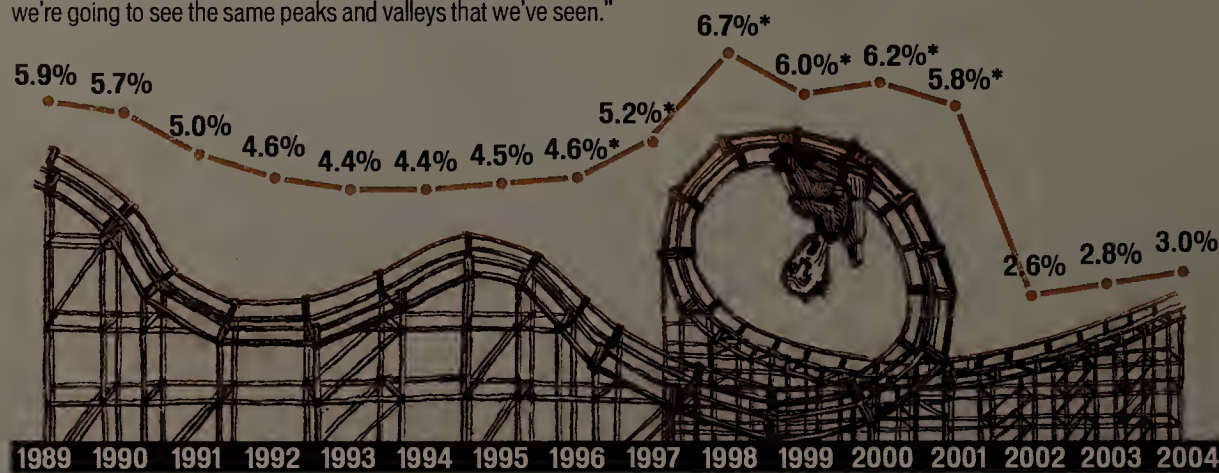
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2004 salary survey of  
nearly 10,000 IT workers.



## IT SALARIES OVER THE YEARS: A ROLLER-COASTER RIDE

When *Computerworld* began tracking IT compensation in 1989, average pay raises were a comfortable 5.9%. The slip began in the early 1990s. And while the dot-com boom of the late 1990s pushed IT compensation higher than ever, the bust caused salaries to plummet. Now, the flat line of the mid-1990s has returned. So, what does the future hold? Gartner analyst Linda Pittenger says she doesn't expect any big changes. "I don't think there's a norm anymore," says Pittenger. "But I don't think we're going to see the same peaks and valleys that we've seen."



\* In these years, *Computerworld* surveyed respondents about changes in their total compensation only. All other years show salary changes.

### AVERAGE TOTAL COMPENSATION IN SELECTED IT JOB TITLES, 2004

AVERAGE FOR ALL TITLES: \$83,908

CIO/vice president of IT	\$162,145
Chief technology officer	\$159,421
Director of systems development	\$140,105
Internet technology strategist	\$116,127
Director of IT operations	\$103,204
Product manager	\$103,027
Information security manager	\$102,553
Systems architect	\$101,308
Application development manager	\$98,666
Project manager	\$92,886
Project leader	\$85,299
IT manager	\$82,851
Database administrator	\$81,710
Systems programmer	\$81,297
Software engineer	\$81,150
Senior systems analyst	\$80,090
Software developer	\$79,713
Computer operations manager	\$79,067
Information security specialist	\$73,207
Network engineer	\$72,720
Network manager	\$72,671
Help desk/tech support manager	\$71,900
Technology/business analyst	\$69,651
Programmer/analyst	\$65,600
Systems administrator	\$64,925
Systems analyst	\$61,217
Web developer	\$59,859
Network administrator	\$53,644
Help desk/tech support specialist	\$46,468
Technician	\$41,757

### HIGHEST INCREASES

6%	Chief security officers
5%	Information security managers
5%	Data warehousing managers
4%	Web developers
4%	Information security specialists
4%	Quality assurance specialists

### WIN FOR WOMEN

Women outpaced men for average increases in salary. (Figures are based on changes in individual compensation.)

**+3.2%** **+2.4%**

Female  
(Base: 1,809)

Male  
(Base: 7,480)

And women had smaller decreases on average in bonuses:

**-1.5%**

**-2.1%**

Female  
(Base: 1,809)

Male  
(Base: 7,480)



because the economic situation still supports such behavioral thinking," says Linda Pittenger, an analyst at Gartner Inc. "I also believe that over time, IT professionals... are going to get to that boiling point, but they're not there yet."

Some unhappy IT professionals are considering moving to new jobs, Pittenger adds. But they're learning that the grass isn't always greener somewhere else.

"We all know someone personally who left [the company], but the project they got hired to do got canceled and they are jobless," says the senior IT analyst who asked not to be identified. So for now, she — and many IT professionals like her — will stay put.

### Where to Put the Blame

More than 27% of survey respondents reported increased use of offshore outsourcing at their companies in the past year. David Foote, president of Foote Partners LLC in New Canaan, Conn., says offshore outsourcing had a major influence on pay this year. Specifically, pay for both noncertified application programming skills and enterprise application development skills has declined 19% to 21% over the past two years, according to Foote Partners research. "As more applications development work is transferred offshore or at least directed away from IT full timers, premium pay becomes unnecessary," Foote says.

Poor corporate performance has also prompted executives to cut pay across the board. Kohl's Department Stores Inc. in Menomonee Falls, Wis., lowered pay raises for all employees, not just those in IT, says Paul Lewandowski, an e-commerce testing coordinator. "We didn't have as good a year as the company expected," says Lewandowski, whose pay raise dropped from 5% in 2003 to 4% in 2004. But the "double whammy" came when the IT staff lost a week of vacation, he says. Now, employees must keep track of overtime until they earn the extra week — and they can use the earned time off only when project schedules allow. "It's a kick in the teeth," he says.

### Regional Inequalities

IT workers living in the South Atlantic region fared better than most others in pay raises this year, while those in the Northeast and on the West Coast experienced flat salaries. IT workers in the North Central region saw increases slightly below average.

McLean, Va.-based Stan Kiyota says his salary jumped 6% this year and was topped off with a 27% bonus. "I wish I could say it was all me," says the senior information security manager at Booz Allen Hamilton Inc., "but part of this is the location. This market is so hot here, it's virtually zero percent high-tech unemployment right now."


CIO Jason Blevins hasn't had a raise in two years at Manchester Tool and Die Inc. in North Manchester, Ind. Though he understands that times are tough for the company, he says the lack of raises hurts morale. "If we go another round here without increases, then I know there's going to be some screaming," he says.

IT manager David Levine saw his salary jump 4.5%


*Continued on page 52*

### SECURITY PROS EARN TOP DOLLAR

IT workers in the security field received some of the highest pay raises last year.

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Continued from page 50

at Sony Electronics Inc. in Park Ridge, N.J. "I'm making enough money that even 4.5% is a decent raise," he says. In fact, 51% of survey respondents said they're satisfied with their pay despite low or no raises, and 80% are still satisfied with their career choice.

The good news for IT workers is that bonuses are on the upswing after dropping an average of 1.8% last year. The bad news: They rose an average of just 1%.

"The last really good bonus was in 2000. They've been about half that [amount] since," says the IT security strategist. "It's not the best, but it's better than a kick" out the door, he adds.

Terry Broadbent, a database administrator at L-3 Communications Corp. in Salt Lake City, hasn't seen a cash bonus in 10 years

because L-3 is offering other types of incentives.

"I've been involved in teams over the years, and we've received... a jacket or a portable TV," says Broadbent, a 26-year veteran of the defense contractor. "That sits on the shelf and gathers dust. I much prefer that came as a cash bonus."

Pittenger says companies are moving away from the "peanut butter method" of spreading bonuses evenly and instead use precious funds to reward a small slice of superior performers.

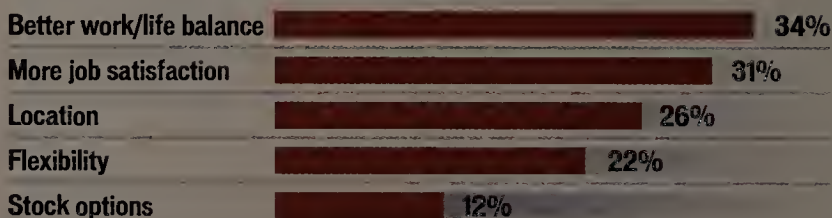
"Companies are finally saying, 'Who are the 10 people who made things happen last year? Let's take care of them,'" Pittenger says. "It doesn't motivate the top performers if they get 4% bonuses and the low performers get 3%. If the top get 10% bonuses and the low performers get 1%, [companies] send a

POLLY BECKER



## GREENER PASTURES

42% said they wouldn't switch to a job with lower compensation. Of those who would, these factors topped the list of motivators:



message that 'we pay for superior performance.'"

After three years of lackluster average pay raises and meager bonuses, can IT professionals expect a return to the boom days of compensation anytime soon?

"I don't think there's a norm anymore," says Pittenger. "But I don't think we're going to see the same peaks and valleys that we've seen."

Pittenger does expect a small resurgence of IT jobs and pay beginning in 2008, when a record num-

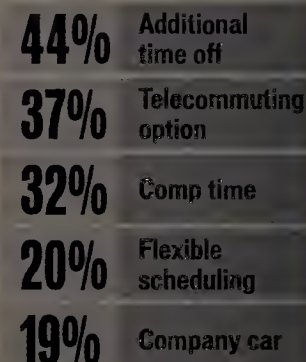
ber of IT professionals will retire and fewer new MIS and computer science graduates will enter the market. "We're going to go into that demand role again where companies can't find people." **49872**

Collett is a freelance writer in Chicago. Contact her at [stcollett@aol.com](mailto:stcollett@aol.com).

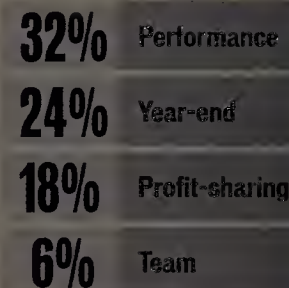
**CHARTS:** For compensation information for 30 IT job titles, turn to PAGE 54.

### PERKED UP

Top five perks that respondents wished their companies offered:



Top types of bonuses respondents received:



## TOTAL COMPENSATION BY REGION

■ **New England:** Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island

■ **Middle Atlantic:** New York, New Jersey, Pennsylvania

■ **South Atlantic:** Delaware, District of Columbia, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Puerto Rico, U.S. Virgin Islands

■ **North Central:** Wisconsin, Michigan, Illinois, Indiana, Ohio, North Dakota, South Dakota, Minnesota, Nebraska, Iowa, Kansas, Missouri

■ **South Central:** Kentucky, Tennessee, Mississippi, Alabama, Oklahoma, Arkansas, Louisiana, Texas

■ **Mountain:** Idaho, Montana, Wyoming, Nevada, Utah, Colorado, Arizona, New Mexico

■ **Pacific:** Alaska, Washington, Oregon, California, Hawaii, Guam

CIO/vice president of IT

Director of IT operations

Help desk/tech support manager

Application development manager

Project manager

Database administrator

Help desk/tech support specialist

Technology/business systems analyst

Network administrator

Network engineer

Programmer/analyst

Project leader

Software developer

Software engineer

Systems administrator

Systems analyst

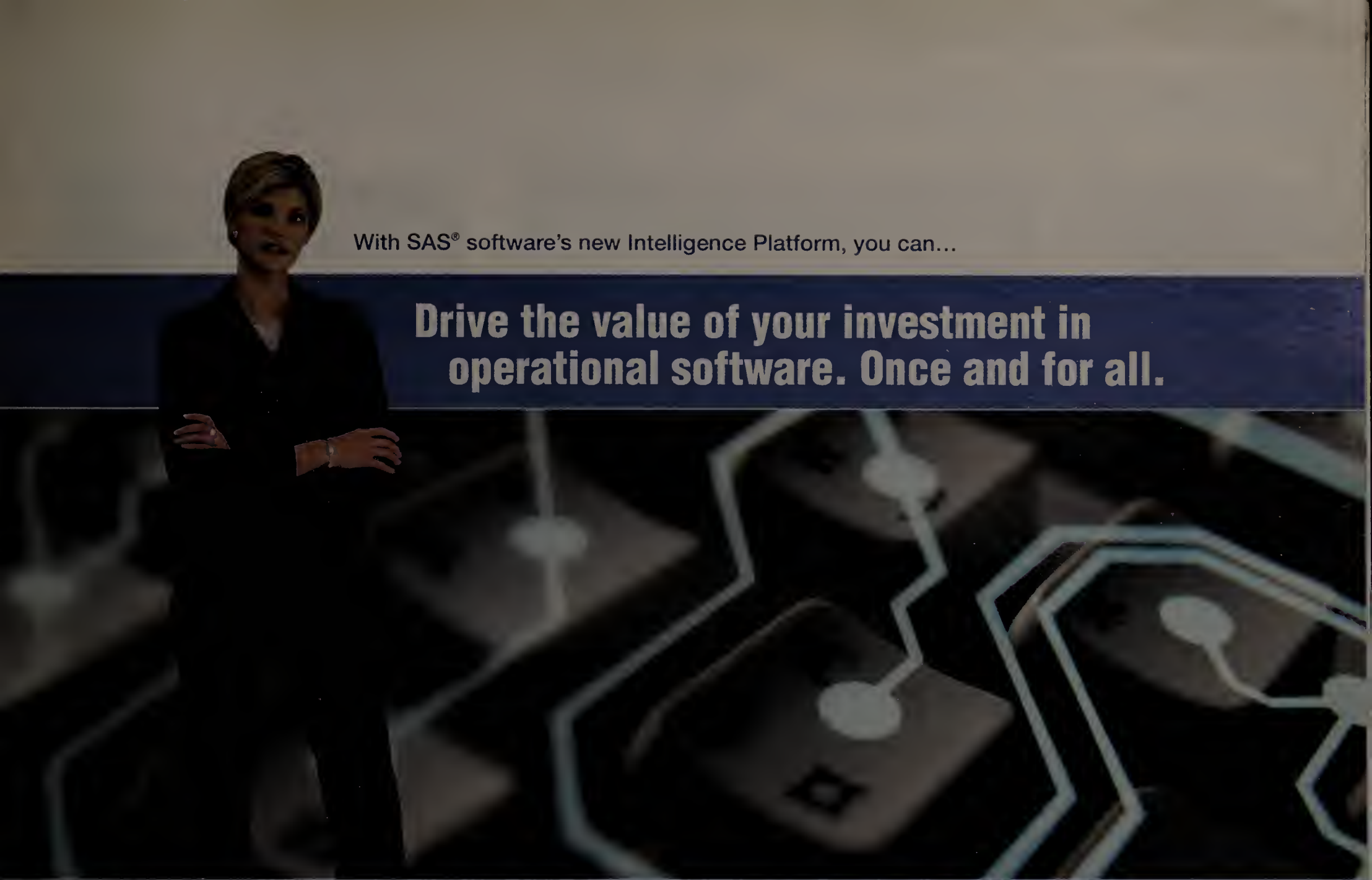
Systems architect

	NEW ENGLAND	MIDDLE ATLANTIC	SOUTH ATLANTIC	NORTH CENTRAL	SOUTH CENTRAL	MOUNTAIN	PACIFIC
CIO/vice president of IT	\$172,010	\$188,801	\$157,398	\$154,739	\$161,943	\$122,680*	\$163,523
Director of IT operations	\$99,307	\$121,691	\$103,892	\$91,331	\$85,543	\$88,518	\$117,039
Help desk/tech support manager	\$75,626	\$85,018*	\$74,974	\$66,677	\$66,227*	\$69,760	\$74,929*
Application development manager	\$117,150*	\$106,440	\$103,490	\$90,823	\$94,127	\$87,810	\$103,298
Project manager	\$99,624	\$100,813	\$98,361	\$90,900	\$93,250	\$87,195*	\$91,242
Database administrator	\$80,299	\$86,930*	\$81,334	\$78,602	\$86,449	\$73,506*	\$93,189*
Help desk/tech support specialist	\$50,429*	\$48,959	\$45,987	\$44,552	\$42,941	\$41,202*	\$51,036
Technology/business systems analyst	\$81,613*	\$75,812	\$73,941	\$67,479	\$62,470	\$58,940*	\$78,641
Network administrator	\$51,479*	\$54,990	\$57,591	\$51,904	\$48,547	\$52,977	\$58,357
Network engineer	\$76,776	\$72,499*	\$70,324	\$72,888	\$71,420	\$67,515	\$72,836*
Programmer/analyst	\$62,966*	\$71,213	\$67,470	\$62,437	\$65,172	\$70,467*	\$70,361
Project leader	\$90,844*	\$98,287	\$89,645	\$80,481	\$82,820*	\$80,665	\$95,345*
Software developer	\$85,050	\$79,866*	\$80,557	\$73,253	\$79,746*	\$68,600	\$91,275
Software engineer	\$89,030*	\$77,271	\$86,214	\$76,785	\$81,584*	\$82,612*	\$90,594
Systems administrator	\$71,487*	\$66,085	\$69,127	\$63,155	\$62,122	\$68,274	\$68,426
Systems analyst	\$75,599	\$61,323	\$65,330	\$60,294	\$59,100	\$59,174	\$69,104*
Systems architect	\$130,446	\$105,557*	\$102,642	\$95,241	\$98,817*	\$118,181*	\$114,365

\* The total base for this job title in this particular region was fewer than 30 responses but more than 15. These figures should be used for comparison only, because they don't constitute a statistically significant sampling.

Gray text: The total base for this job title in this particular region was fewer than 16 responses but more than nine. These figures should be used for comparison only.





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# COMPUTERWORLD SALARY SURVEY 2004

SENIOR MANAGEMENT POSITIONS				
CIO/vice president of IT	Chief technology officer	Director of systems development	Director of IT operations	Internet technology strategist
2.1%	2.1%	2.8%	2.7%	1.3%
Average salary <b>\$132,709</b>	Average salary <b>\$132,132</b>	Average salary <b>\$117,597</b>	Average salary <b>\$92,239</b>	Average salary <b>\$101,361</b>
Bonus <b>\$29,436</b>	Bonus <b>\$27,289</b>	Bonus <b>\$22,508</b>	Bonus <b>\$10,965</b>	Bonus <b>\$14,766</b>
Total <b>\$162,145</b>	Total <b>\$159,421</b>	Total <b>\$140,105</b>	Total <b>\$103,204</b>	Total <b>\$116,127</b>
2003 Total <b>\$158,790</b>	2003 Total <b>\$156,212</b>	2003 Total <b>\$136,262</b>	2003 Total <b>\$100,483</b>	2003 Total <b>\$114,589</b>

## AVERAGE TOTAL COMPENSATION BY INDUSTRY

Manufacturing (noncomputer) <b>\$179,369</b>	Computer services/consulting* <b>\$181,309</b>	Computer services/consulting* <b>\$166,555</b>	Education <b>\$85,088</b>	Computer services/consulting* <b>\$130,800</b>
Banking <b>\$163,005</b>	Government <b>\$84,009</b>	Legal/insurance/real estate <b>\$128,304</b>	Health care <b>\$92,154</b>	Finance/accounting <b>\$127,818</b>
Computer services/consulting <b>\$168,514</b>	Legal/insurance/real estate <b>\$217,867</b>	Manufacturing (noncomputer) <b>\$139,815</b>	Manufacturing (noncomputer) <b>\$101,631</b>	Telecommunications <b>\$104,439</b>
Legal/insurance/real estate <b>\$181,173</b>		Finance <b>\$128,110</b>	Government <b>\$83,827</b>	
Government* <b>\$101,213</b>		Retail <b>\$114,867</b>	Computer services/consulting <b>\$137,287</b>	
Education* <b>\$125,225</b>			Legal/insurance/real estate* <b>\$109,461</b>	
Finance/accounting* <b>\$203,067</b>			Nonprofit* <b>\$75,858</b>	
Health care* <b>\$158,593</b>				

## AVERAGE TOTAL COMPENSATION BY COMPANY REVENUE

Less than \$100M <b>\$116,688</b>	Less than \$100M <b>\$147,010</b>	Less than \$100M <b>\$122,171</b>	Less than \$100M <b>\$81,907</b>	Less than \$100M* <b>\$92,708</b>
\$100M to \$999.9M <b>\$172,593</b>	\$100M to \$999.9M <b>\$178,220</b>	\$100M to \$999.9M <b>\$135,278</b>	\$100M to \$999.9M <b>\$111,632</b>	\$100M to \$999.9M* <b>\$104,694</b>
\$1B to \$10B <b>\$202,438</b>	\$1B to \$10B <b>\$189,792</b>	\$1B to \$10B <b>\$139,520</b>	\$1B to \$10B <b>\$133,359</b>	\$1B to \$10B* <b>\$128,258</b>
More than \$10B <b>\$233,481</b>	More than \$10B <b>NA</b>	More than \$10B* <b>\$182,306</b>	More than \$10B <b>\$166,174</b>	More than \$10B* <b>\$133,000</b>

MIDDLE MANAGEMENT POSITIONS			
Computer operations manager	Help desk/tech support manager	Information security manager	IT manager
2.7%	3.8%	4.9%	2.4%
Average salary <b>\$72,493</b>	Average salary <b>\$67,209</b>	Average salary <b>\$90,137</b>	Average salary <b>\$76,124</b>
Bonus <b>\$6,574</b>	Bonus <b>\$4,691</b>	Bonus <b>\$12,416</b>	Bonus <b>\$6,727</b>
Total <b>\$79,067</b>	Total <b>\$71,900</b>	Total <b>\$102,553</b>	Total <b>\$82,851</b>
2003 Total <b>\$76,987</b>	2003 Total <b>\$69,271</b>	2003 Total <b>\$97,777</b>	2003 Total <b>\$80,877</b>

## AVERAGE TOTAL COMPENSATION BY INDUSTRY

Government <b>\$75,744</b>	Computer services/consulting* <b>\$76,245</b>	Government* <b>\$91,871</b>	Manufacturing (noncomputer) <b>\$86,193</b>
Manufacturing (noncomputer) <b>\$72,113</b>	Education* <b>\$52,651</b>	Computer services/consulting <b>\$96,596</b>	Government <b>\$70,485</b>
Legal/insurance/real estate <b>\$75,167</b>	Government <b>\$62,326</b>	Banking <b>\$111,193</b>	Computer services/consulting <b>\$93,633</b>
	Health care <b>\$68,236</b>		Legal/insurance/real estate <b>\$91,364</b>
	Banking <b>\$72,905</b>		Education <b>\$65,896</b>
	Finance/accounting <b>\$82,409</b>		Mining/agriculture/construction/engineering <b>\$71,522</b>
	Entertainment/advertising <b>\$79,711</b>		Banking <b>\$92,832</b>

## AVERAGE TOTAL COMPENSATION BY COMPANY REVENUE

Less than \$100M <b>\$67,330</b>	Less than \$100M <b>\$61,441</b>	Less than \$100M* <b>\$82,300</b>	Less than \$100M <b>\$69,113</b>
\$100M to \$999.9M* <b>\$78,302</b>	\$100M to \$999.9M <b>\$72,506</b>	\$100M to \$999.9M* <b>\$101,480</b>	\$100M to \$999.9M <b>\$86,762</b>
\$1B to \$10B* <b>\$91,780</b>	\$1B to \$10B* <b>\$78,887</b>	\$1B to \$10B <b>\$115,219</b>	\$1B to \$10B <b>\$98,926</b>
More than \$10B <b>\$99,402</b>	More than \$10B* <b>\$99,236</b>	More than \$10B* <b>\$111,213</b>	More than \$10B <b>\$110,396</b>

Charts continue on page 56

% Average percentage increase, 2003-2004

\* The total base for this job title in this particular industry or company size was fewer than 30 responses but more than 15. These figures should be used for comparison only, because they don't constitute a statistically significant sampling.

Gray text: The total base for this job title in this particular industry or company size was fewer than 16 responses but more than nine. These figures should be used for comparison only.

## BIGGEST UPTICKS IN SALARY

Food/  
beverage  
(Base: 79) **5.4%**

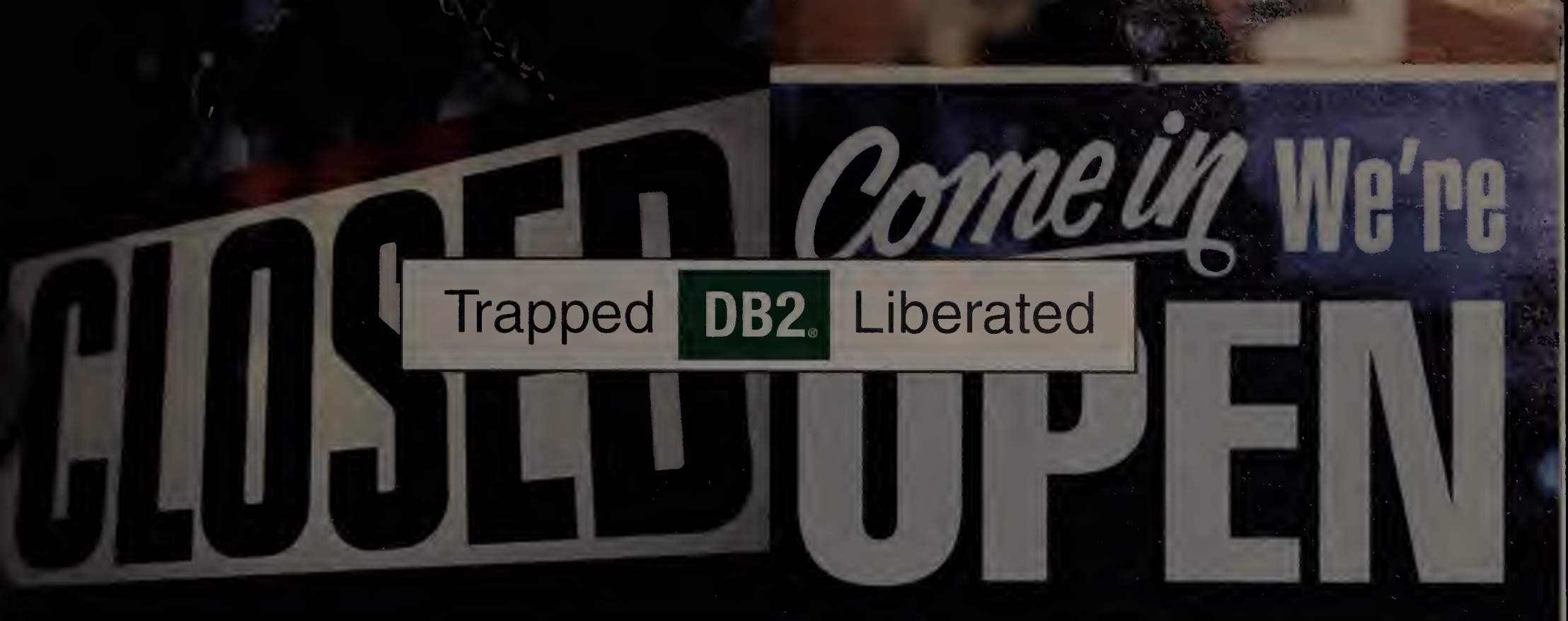
Defense/  
aerospace  
(Base: 276) **4.1%**

Nonprofit  
organizations  
(Base: 413) **4.1%**

## A SAMPLING OF OTHER JOB TITLES

Chief security officer	Director of e-commerce	Communications manager	Database manager	Data warehousing manager	E-commerce manager	Internet/intranet manager	Communications specialist	Computer operator/lead operator
6%	1.2%	1.6%	1.1%	5.1%	1.9%	2.4%	1.2%	3.9%
Average salary <b>\$106,500</b>	Average salary <b>\$111,873</b>	Average salary <b>\$74,293</b>	Average salary <b>\$87,249</b>	Average salary <b>\$82,670</b>	Average salary <b>\$75,205</b>	Average salary <b>\$77,841</b>	Average salary <b>\$62,476</b>	Average salary <b>\$35,274</b>
Bonus <b>\$13,486</b>	Bonus <b>\$19,653</b>	Bonus <b>\$5,712</b>	Bonus <b>\$10,244</b>	Bonus <b>\$9,049</b>	Bonus <b>\$8,134</b>	Bonus <b>\$13,627</b>	Bonus <b>\$3,746</b>	Bonus <b>\$1,698</b>
Total <b>\$119,986</b>	Total <b>\$131,526</b>	Total <b>\$80,005</b>	Total <b>\$97,493</b>	Total <b>\$91,719</b>	Total <b>\$83,339</b>	Total <b>\$91,468</b>	Total <b>\$66,222</b>	Total <b>\$36,972</b>
Base: 28	Base: 36	Base: 77	Base: 72	Base: 28	Base: 29	Base: 41	Base: 60	Base: 31
2003 Total <b>\$113,228</b>	2003 Total <b>\$129,945</b>	2003 Total <b>\$78,771</b>	2003 Total <b>\$96,449</b>	2003 Total <b>\$87,261</b>	2003 Total <b>\$81,780</b>	2003 Total <b>\$88,937</b>	2003 Total <b>\$65,440</b>	2003 Total <b>\$35,372</b>





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higher than DB2. Solitaire claims that, on average, Oracle required 25% more time to manage than DB2. And tpc.org rates DB2 as the overall price/performance leader for TPC-C on Linux, UNIX and Windows. Ahead of both Oracle and Microsoft® SQL Server.\*

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## MIDDLE MANAGEMENT POSITIONS

Network manager	Product manager	Application development manager	Project manager
2.7%	1.4%	2.4%	2.2%
Average salary <b>\$67,119</b>	Average salary <b>\$90,679</b>	Average salary <b>\$90,582</b>	Average salary <b>\$85,194</b>
Bonus <b>\$5,552</b>	Bonus <b>\$12,348</b>	Bonus <b>\$8,084</b>	Bonus <b>\$7,692</b>
Total <b>\$72,671</b>	Total <b>\$103,027</b>	Total <b>\$98,666</b>	Total <b>\$92,886</b>
2003 Total <b>\$70,748</b>	2003 Total <b>\$101,633</b>	2003 Total <b>\$96,339</b>	2003 Total <b>\$90,889</b>

## AVERAGE TOTAL COMPENSATION BY INDUSTRY

Government*	Computer services/consulting	Computer services/consulting	Computer services/consulting
<b>\$62,670</b>	<b>\$104,831</b>	<b>\$103,796</b>	<b>\$99,050</b>
Education*	Manufacturing (computer)*	Manufacturing (noncomputer)*	Banking
<b>\$57,684</b>	<b>\$120,690</b>	<b>\$95,853</b>	<b>\$87,076</b>
Manufacturing (noncomputer)		Government*	Government
<b>\$68,562</b>		<b>\$75,144</b>	<b>\$90,248</b>
Health care		Health care*	Manufacturing (noncomputer)
<b>\$75,417</b>		<b>\$96,521</b>	<b>\$94,047</b>
		Banking*	Legal/insurance/real estate
		<b>\$123,980</b>	<b>\$92,838</b>
		Manufacturing (computer)*	Health care
		<b>\$116,894</b>	<b>\$85,140</b>
		Legal/insurance/real estate	Finance/accounting*
		<b>\$105,781</b>	<b>\$105,728</b>
			Telecommunications*
			<b>\$90,964</b>

## AVERAGE TOTAL COMPENSATION BY COMPANY REVENUE

Less than \$100M	Less than \$100M	Less than \$100M	Less than \$100M
<b>\$64,700</b>	<b>\$87,321</b>	<b>\$85,261</b>	<b>\$79,473</b>
\$100M to \$999.9M	\$100M to \$999.9M	\$100M to \$999.9M	\$100M to \$999.9M
<b>\$77,266</b>	<b>\$102,528</b>	<b>\$95,409</b>	<b>\$90,113</b>
\$1B to \$10B	\$1B to \$10B*	\$1B to \$10B	\$1B to \$10B
<b>\$97,009</b>	<b>\$108,529</b>	<b>\$102,651</b>	<b>\$96,525</b>
More than \$10B	More than \$10B*	More than \$10B	More than \$10B
<b>NA</b>	<b>\$118,486</b>	<b>\$117,587</b>	<b>\$104,546</b>

## STAFF AND ENTRY-LEVEL POSITIONS

Database administrator	Help desk/tech support specialist	Information security specialist	Technology/business analyst	Network administrator	Network engineer	Programmer/analyst
1.1%	2.5%	4.4%	1.7%	2.7%	1.7%	2.5%
Average salary <b>\$76,541</b>	Average salary <b>\$44,132</b>	Average salary <b>\$69,530</b>	Average salary <b>\$64,921</b>	Average salary <b>\$50,593</b>	Average salary <b>\$67,081</b>	Average salary <b>\$62,008</b>
Bonus <b>\$5,169</b>	Bonus <b>\$2,336</b>	Bonus <b>\$3,677</b>	Bonus <b>\$4,730</b>	Bonus <b>\$3,051</b>	Bonus <b>\$5,639</b>	Bonus <b>\$3,592</b>
Total <b>\$81,710</b>	Total <b>\$46,468</b>	Total <b>\$73,207</b>	Total <b>\$69,651</b>	Total <b>\$53,644</b>	Total <b>\$72,720</b>	Total <b>\$65,600</b>
2003 Total <b>\$80,827</b>	2003 Total <b>\$45,349</b>	2003 Total <b>\$70,124</b>	2003 Total <b>\$68,491</b>	2003 Total <b>\$52,246</b>	2003 Total <b>\$71,492</b>	2003 Total <b>\$64,024</b>

## AVERAGE TOTAL COMPENSATION BY INDUSTRY

Computer services/consulting	Computer services/consulting	Computer services/consulting*	Computer services/consulting	Government	Computer services/consulting	Computer services/consulting
<b>\$84,013</b>	<b>\$45,236</b>	<b>\$76,741</b>	<b>\$75,763</b>	<b>\$56,000</b>	<b>\$73,865</b>	<b>\$65,417</b>
Government	Government	Banking*	Government	Manufacturing (noncomputer)	Government*	Manufacturing (noncomputer)
<b>\$67,521</b>	<b>\$52,235</b>	<b>\$54,502</b>	<b>\$63,282</b>	<b>\$53,596</b>	<b>\$66,917</b>	<b>\$63,414</b>
Manufacturing (noncomputer)*	Manufacturing (noncomputer)	Government*	Manufacturing (noncomputer)	Education	Telecommunications*	Legal/insurance/real estate
<b>\$77,151</b>	<b>\$40,687</b>	<b>\$74,731</b>	<b>\$69,379</b>	<b>\$46,685</b>	<b>\$75,208</b>	<b>\$74,793</b>
Legal/insurance/real estate*	Health care	Finance/accounting*	Health care*	Computer services/consulting*	Manufacturing (noncomputer)*	Government
<b>\$82,220</b>	<b>\$41,503</b>	<b>\$79,121</b>	<b>\$65,166</b>	<b>\$58,788</b>	<b>\$68,244</b>	<b>\$57,771</b>
Finance/accounting*	Education	Manufacturing (noncomputer)	Legal/insurance/real estate*	Health care*	Banking	Banking
<b>\$97,267</b>	<b>\$34,427</b>	<b>\$77,894</b>	<b>\$72,838</b>	<b>\$54,741</b>	<b>\$73,685</b>	<b>\$71,771</b>
Telecommunications	Banking*		Banking*	Legal/insurance/real estate*	Finance/accounting	Health care
<b>\$90,385</b>	<b>\$44,596</b>		<b>\$63,535</b>	<b>\$58,848</b>	<b>\$86,500</b>	<b>\$60,533</b>
Banking	Legal/insurance/real estate*		Finance/accounting*	Banking*	Manufacturing (computer)	Finance/accounting*
<b>\$90,330</b>	<b>\$46,483</b>		<b>\$62,148</b>	<b>\$51,399</b>	<b>\$81,913</b>	<b>\$75,016</b>
Health care				Nonprofit		
<b>\$82,784</b>				<b>\$43,606</b>		

## AVERAGE TOTAL COMPENSATION BY COMPANY REVENUE

Less than \$100M	Less than \$100M	Less than \$100M	Less than \$100M	Less than \$100M	Less than \$100M	Less than \$100M
<b>\$72,470</b>	<b>\$40,295</b>	<b>\$64,588</b>	<b>\$59,109</b>	<b>\$51,075</b>	<b>\$66,179</b>	<b>\$58,852</b>
\$100M to \$999.9M	\$100M to \$999.9M	\$100M to \$999.9M	\$100M to \$999.9M	\$100M to \$999.9M	\$100M to \$999.9M	\$100M to \$999.9M
<b>\$81,238</b>	<b>\$49,465</b>	<b>\$73,118</b>	<b>\$70,582</b>	<b>\$56,990</b>	<b>\$71,927</b>	<b>\$66,440</b>
\$1B to \$10B	\$1B to \$10B	\$1B to \$10B	\$1B to \$10B	\$1B to \$10B*	\$1B to \$10B	\$1B to \$10B
<b>\$88,228</b>	<b>\$51,727</b>	<b>\$73,961</b>	<b>\$74,089</b>	<b>\$58,436</b>	<b>\$80,005</b>	<b>\$71,419</b>
More than \$10B	More than \$10B	More than \$10B	More than \$10B	More than \$10B*	More than \$10B	More than \$10B
<b>\$89,275</b>	<b>\$57,679</b>	<b>\$82,590</b>	<b>\$80,926</b>	<b>\$63,545</b>	<b>\$82,014</b>	<b>\$71,066</b>

Charts continue on page 58

\* Average percentage increase, 2003-2004

\* The total base for this job title in this particular industry or company size was fewer than 30 responses but more than 15. These figures should be used for comparison only, because they don't constitute a statistically significant sampling.

Gray text: The total base for this job title in this particular industry or company size was fewer than 16 responses but more than nine. These figures should be used for comparison only.

## A SAMPLING OF OTHER JOB TITLES

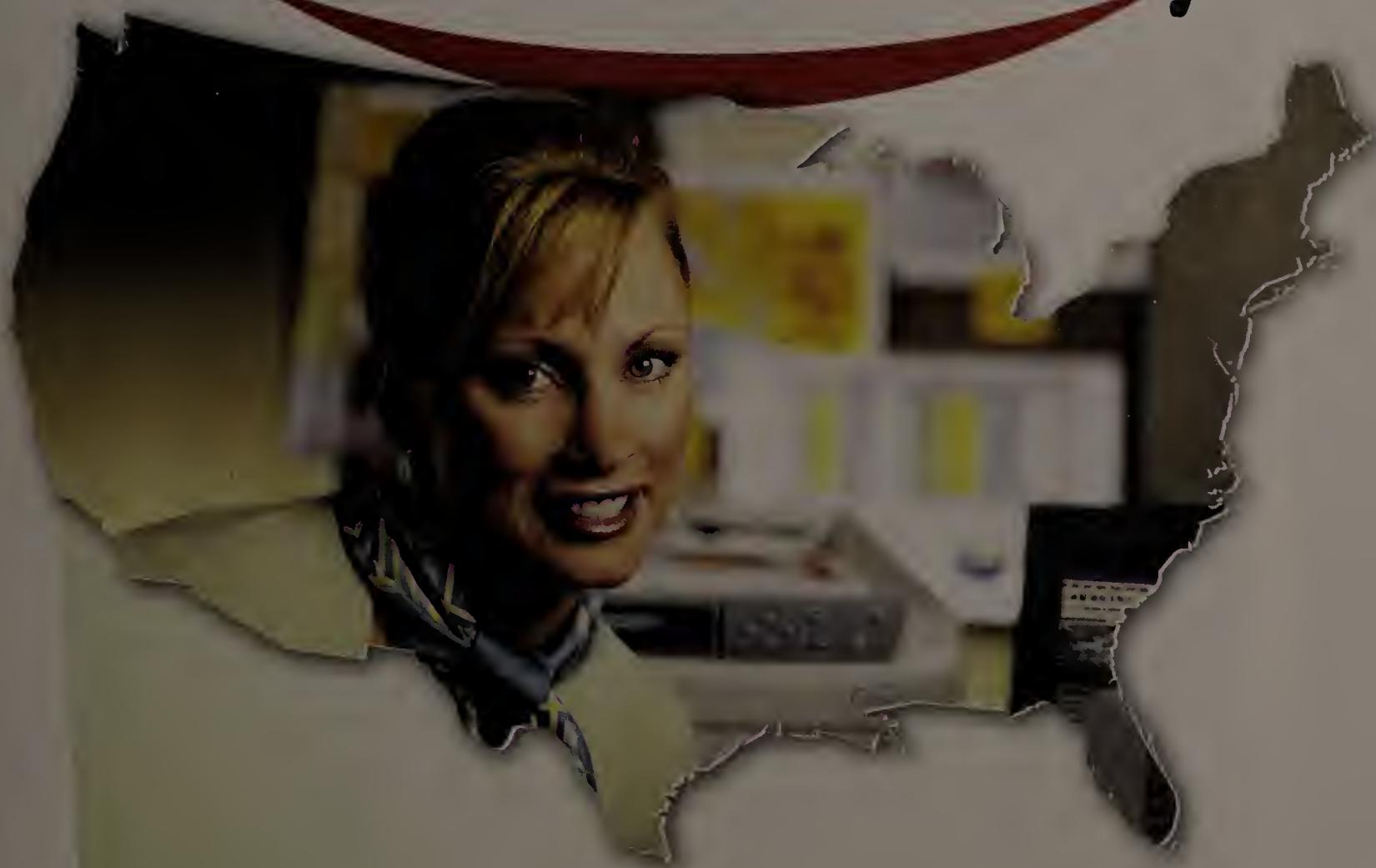
Database analyst	Database architect	Database developer/modeler	E-commerce specialist	Messaging/e-mail/groupware specialist	Network architect	Quality assurance specialist	Technical trainer	Webmaster
2%	3.7%	1.4%	1.3%	2.3%	2.2%	3.5%	1.4%	2.9%
Average salary <b>\$60,792</b>	Average salary <b>\$86,659</b>	Average salary <b>\$66,635</b>	Average salary <b>\$58,017</b>	Average salary <b>\$67,334</b>	Average salary <b>\$78,469</b>	Average salary <b>\$61,234</b>	Average salary <b>\$56,018</b>	Average salary <b>\$54,005</b>
Bonus <b>\$3,359</b>	Bonus <b>\$5,545</b>	Bonus <b>\$3,467</b>	Bonus <b>\$3,074</b>	Bonus <b>\$4,218</b>	Bonus <b>\$5,121</b>	Bonus <b>\$4,882</b>	Bonus <b>\$5,880</b>	Bonus <b>\$1,363</b>
Total <b>\$64,151</b>	Total <b>\$92,204</b>	Total <b>\$70,102</b>	Total <b>\$61,091</b>	Total <b>\$71,552</b>	Total <b>\$83,590</b>	Total <b>\$66,116</b>	Total <b>\$61,898</b>	Total <b>\$55,368</b>
Base: 40	Base: 33	Base: 56	Base: 27	Base: 22	Base: 35	Base: 93	Base: 64	Base: 57
2003 Total <b>\$62,800</b>	2003 Total <b>\$89,871</b>	2003 Total <b>\$68,122</b>	2003 Total <b>\$59,197</b>	2003 Total <b>\$69,091</b>	2003 Total <b>\$81,439</b>	2003 Total <b>\$64,200</b>	2003 Total <b>\$59,097</b>	2003 Total <b>\$53,960</b>

## BIGGEST LOSSES IN BONUSES

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(Base: 87)Entertainment/advertising  
(Base: 271)IT/computer-related services/consulting  
(Base: 1,786)



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# COMPUTERWORLD SALARY SURVEY 2004

STAFF AND ENTRY-LEVEL POSITIONS									
Project leader	Software developer	Software engineer	Systems administrator	Systems analyst	Senior systems analyst	Systems architect	Systems programmer	Technician	Web developer
3.3%	3.1%	1.6%	2.8%	2%	1.9%	2.5%	2.7%	1.5%	4.2%
Average salary <b>\$78,513</b>	Average salary <b>\$73,209</b>	Average salary <b>\$76,292</b>	Average salary <b>\$61,771</b>	Average salary <b>\$58,179</b>	Average salary <b>\$75,834</b>	Average salary <b>\$91,003</b>	Average salary <b>\$76,987</b>	Average salary <b>\$40,313</b>	Average salary <b>\$55,464</b>
Bonus <b>\$6,786</b>	Bonus <b>\$6,504</b>	Bonus <b>\$4,858</b>	Bonus <b>\$3,154</b>	Bonus <b>\$3,038</b>	Bonus <b>\$4,256</b>	Bonus <b>\$10,305</b>	Bonus <b>\$4,310</b>	Bonus <b>\$1,444</b>	Bonus <b>\$4,395</b>
Total <b>\$85,299</b>	Total <b>\$79,713</b>	Total <b>\$81,150</b>	Total <b>\$64,925</b>	Total <b>\$61,217</b>	Total <b>\$80,090</b>	Total <b>\$101,308</b>	Total <b>\$81,297</b>	Total <b>\$41,757</b>	Total <b>\$59,859</b>
2003 Total <b>\$82,596</b>	2003 Total <b>\$77,319</b>	2003 Total <b>\$79,848</b>	2003 Total <b>\$63,174</b>	2003 Total <b>\$60,044</b>	2003 Total <b>\$78,626</b>	2003 Total <b>\$98,795</b>	2003 Total <b>\$79,148</b>	2003 Total <b>\$41,129</b>	2003 Total <b>\$57,431</b>

## AVERAGE TOTAL COMPENSATION BY INDUSTRY

Computer services/ consulting <b>\$86,120</b>	Computer services/ consulting <b>\$84,592</b>	Computer services/ consulting <b>\$83,821</b>	Computer services/ consulting <b>\$72,571</b>	Computer services/ consulting <b>\$63,579</b>	Computer services/ consulting <b>\$83,712</b>	Computer services/ consulting <b>\$96,384</b>	Computer services/ consulting* <b>\$78,081</b>	Education <b>\$32,290</b>	Computer services/ consulting <b>\$62,863</b>
Manufacturing (noncomputer)* <b>\$80,543</b>	Banking* <b>\$77,261</b>	Manufacturing (computer) <b>\$91,025</b>	Manufacturing (noncomputer) <b>\$61,158</b>	Manufacturing (noncomputer)* <b>\$56,679</b>	Manufacturing (noncomputer) <b>\$77,634</b>	Manufacturing (computer)* <b>\$127,464</b>	Health care <b>\$80,288</b>	Computer services/ consulting* <b>\$32,840</b>	Education <b>\$37,325</b>
Government <b>\$82,466</b>	Legal/insurance/ real estate* <b>\$77,684</b>	Defense/aerospace <b>\$76,587</b>	Education <b>\$53,757</b>	Legal/insurance/ real estate* <b>\$62,403</b>	Finance/accounting* <b>\$85,060</b>	Telecommunications* <b>\$97,053</b>	Government <b>\$73,500</b>	Transportation/ logistics* <b>\$47,674</b>	Health care <b>\$59,479</b>
Banking <b>\$97,622</b>	Finance/accounting* <b>\$89,017</b>	Manufacturing (noncomputer)* <b>\$75,575</b>	Legal/insurance/ real estate <b>\$61,536</b>	Government* <b>\$56,293</b>	Banking* <b>\$77,500</b>	Banking* <b>\$102,876</b>	Health care <b>\$40,626</b>	Health care <b>\$40,626</b>	Government <b>\$61,836</b>
Manufacturing (computer) <b>\$97,629</b>	Government <b>\$63,475</b>	Banking <b>\$82,100</b>	Government <b>\$60,833</b>	Health care* <b>\$64,357</b>	Government <b>\$79,486</b>	Defense/aerospace* <b>\$98,956</b>	Government <b>\$44,130</b>	Government <b>\$44,130</b>	Government <b>\$44,130</b>
Finance/accounting <b>\$101,309</b>	Health care <b>\$74,325</b>	Legal/insurance/ real estate <b>\$70,511</b>	Health care* <b>\$64,734</b>	Education* <b>\$53,723</b>	Legal/insurance/ real estate <b>\$82,570</b>	Finance/accounting <b>\$116,771</b>	Manufacturing (noncomputer) <b>\$48,938</b>	Manufacturing (noncomputer) <b>\$48,938</b>	Manufacturing (noncomputer) <b>\$48,938</b>
Defense/aerospace <b>\$82,121</b>	Manufacturing (noncomputer) <b>\$71,027</b>	Telecommunications <b>\$78,685</b>	Telecommunications* <b>\$70,764</b>	Defense/aerospace <b>\$63,876</b>	Health care <b>\$68,407</b>	Legal/insurance/ real estate <b>\$104,146</b>	Government <b>\$92,354</b>	Government <b>\$92,354</b>	Government <b>\$92,354</b>
			Energy/utilities* <b>\$71,281</b>	Banking <b>\$59,287</b>	Defense/aerospace <b>\$84,109</b>	Government <b>\$92,354</b>			

## AVERAGE TOTAL COMPENSATION BY COMPANY REVENUE

Less than \$100M <b>\$73,279</b>	Less than \$100M <b>\$74,273</b>	Less than \$100M <b>\$76,915</b>	Less than \$100M <b>\$56,911</b>	Less than \$100M <b>\$53,885</b>	Less than \$100M <b>\$75,677</b>	Less than \$100M <b>\$92,417</b>	Less than \$100M <b>\$74,664</b>	Less than \$100M <b>\$37,729</b>	Less than \$100M <b>\$53,648</b>
\$100M to \$999.9M <b>\$78,686</b>	\$100M to \$999.9M <b>\$83,246</b>	\$100M to \$999.9M <b>\$73,214</b>	\$100M to \$999.9M <b>\$66,464</b>	\$100M to \$999.9M <b>\$56,983</b>	\$100M to \$999.9M <b>\$77,004</b>	\$100M to \$999.9M <b>\$91,184</b>	\$100M to \$999.9M* <b>\$83,435</b>	\$100M to \$999.9M* <b>\$41,951</b>	\$100M to \$999.9M* <b>\$72,943</b>
\$1B to \$10B <b>\$85,125</b>	\$1B to \$10B <b>\$80,536</b>	\$1B to \$10B <b>\$79,163</b>	\$1B to \$10B <b>\$71,586</b>	\$1B to \$10B <b>\$67,811</b>	\$1B to \$10B <b>\$79,642</b>	\$1B to \$10B <b>\$103,504</b>	\$1B to \$10B <b>\$86,972</b>	\$1B to \$10B* <b>\$55,676</b>	\$1B to \$10B* <b>\$68,336</b>
More than \$10B <b>\$98,457</b>	More than \$10B <b>\$90,216</b>	More than \$10B <b>\$94,706</b>	More than \$10B <b>\$80,549</b>	More than \$10B <b>\$70,275</b>	More than \$10B <b>\$85,721</b>	More than \$10B <b>\$109,539</b>	More than \$10B* <b>\$82,879</b>	More than \$10B <b>NA</b>	More than \$10B <b>\$69,221</b>

% Average percentage increase, 2003-2004

\* The total base for this job title in this particular industry or company size was fewer than 30 responses but more than 15. These figures should be used for comparison only, because they don't constitute a statistically significant sampling.

Gray text: The total base for this job title in this particular industry or company size was fewer than 16 responses but more than nine. These figures should be used for comparison only.


## Methodology

Computerworld's 18th Annual Salary Survey was administered via the Internet. Both *Computerworld* print subscribers and visitors to *Computerworld.com* were included in the survey.

The collection of survey data began May 3 and concluded July 23. A total of 10,745 people responded to the survey. Of those respondents, 9,854 were employed full or part time and were eligible to complete the entire survey. At the 95% confidence level,

the margin of error for this sample size is less than +/-1 percentage point.

Respondents were asked to report the percentage change in their compensation for 2003 to 2004. Compensation figures for 2003 were calculated based on the percentage change reported by the respondents.

**ONLINE** For a detailed look at how we conducted this survey, visit our Web site:  
 **QuickLink 49969**  
[www.computerworld.com](http://www.computerworld.com)

## WHO THEY ARE

Eighty percent of the respondents were men, 91% were employed full time, and 45% had a bachelor's degree or higher. The respondents had an average of 14 years in IT, and their average age was 41. Fifty-four percent indicated that they had some level of certification.

Forty-two percent of our respondents indicated that they were in management, whereas 58% said they held staff or technical posi-

tions. Five percent said they were employed as contractors or consultants. The most well-represented industry was computer-related services/consulting, with 18% saying they worked in that field.

Eighty-three percent reported that they held the same job last year.

More than 29% of the respondents said they reside in the North Central U.S., making it the most well-represented geographic region, followed by the South Atlantic (20%).





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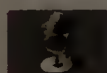
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## IT Careers: Software Remains the Hot Skill for IT

Despite heavy losses in jobs over the past four years, more information technology professionals are software programmers than any other job category. According to the Information Technology Association of America, U.S. companies will hire close to 30,000 programmers in 2004. The fall in demand illustrates the change in the software engineering world: two decades ago systems were expensive and people weren't. Today, systems are inexpensive and take up less space and overhead; people are the expense.

Along with this change, the evolution of programming languages allows software engineers to tackle the task at hand versus dealing with the background language that others created to simplify the process. A third factor is that companies no longer want unique programming. They need applications that work together and work with customers' and suppliers' systems, as well. And they need to be able to upgrade quickly, without the rework customization required.

The news isn't all bad, however. There are those 30,000 jobs that need to be filled this year. The software programmers who fill them will have skills that extend far beyond coding. "We used to see a need for people out there creating chunks and pieces of larger systems," says Brad Holtz, president and CEO of Cyon Research and founder of the Congress on the Future of Software Engineering. "Now, programmers work interactively, in real-time, collaborative environments."

The new programming environment requires new skills. Holtz says, "On a simple level, this means programmers needs the ability to work interactively via instant messaging and e-mail, but even that's not enough. The software tools and communication skills need to be an integrated part of the programmer's daily life." Critical among these is a keen understanding of repeatable digital validation that protects the credibility of the data as it shifts among users.



Holtz says protection of intellectual property is another mainstay of the software programmer's new environment. "First, we need to draw a distinction between outsourcing and off-shoring work," he explains. "Many U.S. companies off-shore work to their own operations outside the United States. Many also outsource work to a programmer next door. As both become more prevalent, software programmers have to think in terms of intellectual property and the corresponding security lockdowns. You can't go about programming without thinking through where it's going, the permissions required at the other end to get the job done and the risks of sharing. The software engineer executes those policies."

The secret to careers in software programming, according to Holtz and other career gurus is, "by doing things that aren't likely to be eaten up by the marketplace. Being smart is important," Holtz advises. "If I can say not just how to automate a process but also can focus on how what I'm doing today will play out in the future and on other parts of the organization, then I'm invaluable. Understanding the business systems is crucial – a programmer with an MBA is more valuable than one without one. A single programmer who has a grasp of larger, complex systems can accomplish more than a whole team of programmers who doesn't. That's the premise behind the book *Mythical Man-Month* and it's something I would strongly recommend to programmers."

For more information about IT Careers advertising, please call: 800.762.2977

Produced by Carole R. Hedden

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Jr. Software Engineer: Entry-level position to develop, create & modify com. applications software using VB, VBScript, JavaScript, Coldfusion. Analyze & develop software solutions. Req. B. Sc. in C S. No exp. req but must demo ability to perform job through either course work or project in VB (Script) & Coldfusion. 40 hr/wk. Resume to HR Recruiting Mgr, InfoPro Inc., 8200 Greensboro Dr, Ste 1450, McLean, VA 22102

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If interested, please mail your resume to:

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Audit Application Developer (Nashville, Tennessee) - Responsible for all phases of IT project life cycle. Develop & maintain Microsoft web-based apps utilizing C, C++, Visual Basic, VB Script, & JavaScript. Gather & analyze audit & facility end-user requirements, project planning, client-server/web app dev & testing/documentation of apps. Administer Microsoft platform database. Use data mining concepts including: neural networks, linear & logistical regression & decision trees. Travel required. Must have a Bach deg. or foreign deg. equiv. in Comp. Sci. Eng, or related field & 1 yr exp. in the job offered or 1 yr exp. in all phases of the IT project life cycle. Exp. may have been obtained concurrently & must include: (i) 1 yr exp. each in dev. C, C++, Visual Basic, VB Script, & JavaScript; (ii) 1 yr exp. administering a Microsoft platform database; (iii) 1 yr dev. & maintaining Microsoft web-based apps; (iv) 1 yr exp. in data mining concepts including: neural networks, linear & logistical regression & decision trees. Must have legal authority to work in U.S. Send resume to B. Carver, (REF: AAD), Director, Employee Relations, HCA Management Services, LP, One Park Plaza, Nashville, TN 37203.

F/T Computer Programmer. Responsible for evaluating user requests for new and modified programs and formulating plans outlining steps to develop or modify programs. Consult with users to identify current operating procedures and clarify program objectives. Develop and maintain specifications, modifications and additions to programs using systems analysis. Implement the development of, and modifications to, programs using iSeries, AS/400 systems, and RPG/400. Recreate steps taken by users to locate and correct problems. Analyze, review and modify programs to increase operating efficiency using Delphi and Java programming languages. Adapt programs to new requirements and monitor their performance after implementation. Must have a Bachelor's degree in Computer Science, Electronic Engineering, related field or foreign degree equivalent. Must have 3 yrs. of exp. in job offered or a position w/ same duties. Salary: Competitive. Send resume to: C. Lesker, Datatex TIS, Inc., 11810 Northfall LN, Bldg. 1203, Alpharetta, GA 30004.

Senior Systems Engineer (Birmingham, AL) - Analyze business requirements & propose systems solutions to satisfy business needs utilizing high availability sys design. Prototype systems & identify hardware/software sys reqs. Develop project plans & supporting sys specifications/design/deployment documentation. Utilize storage techs, backup techs, TCP/IP, Fibre Channel, storage related protocols, & UNIX. Responsible for disaster recovery planning. Report to Director of Platform Eng. & liaise w/team leads/project mgrs to coordinate sys strategy. Share sys testing & customer support responsibilities. Must have BS degree or equiv. in Comp. Sci., Engineering or related field & 6 yrs of exp. in the job offered or 6 yrs of exp. as a systems eng. or software eng. position. Exp. mentioned may have been obtained concurrently & must include: (i) 3 yrs exp. each w/the storage techs SAN, NAS, HSM; (ii) 3 yrs exp. each in backup techs & disaster recovery planning; (iii) 4 yrs exp. each with TCP/IP, Fibre Channel & storage related protocols; (iv) 3 yrs exp. in UNIX; (v) 1 yr exp. in "high availability" sys design. Must have legal authority to work in U.S. Send resume to P. Fetterolf (REF:SE), Emageon UV, Inc., 1209 Corporate Dr., Ste. 400, Birmingham, AL 35242.

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**Systems Engineer - Design, develop and implement software systems for secure enterprise and RFID (radio frequency identification) systems and applications.** Will determine end-user requirements, define software deployment procedures; deploy and customize solutions and quality assurance. Must have Bachelor's degree in Engineering, Computer Science or related field, 3 years of experience in the design, development and deployment of real-time, secure, large-scale enterprise applications designed for e-commerce, point of sale systems, or supply chain management, and expertise in data modeling, migration, and integration interface design and development; Java, JavaScript, XML, HTML, JSP, J2EE & CSS; UNIX and Windows; HTTP & SOAP; Weblogic and TOMCAT; Oracle and MS SQL Server. Job reference: Sys Eng

Please e-mail a cover letter with Job reference, resume and salary requirements to [oitjobs@oatystems.com](mailto:oitjobs@oatystems.com).

#### IT Analyst I

Roxane Laboratories, Inc. has an immediate opening in its Columbus, Ohio office for the position of IT Analyst I.

Assists with maintaining codes for new systems, builds install packages, ensures that all solutions are implemented in a timely manner and properly tested, edits application component functional specifications and technical design documents and assists with web development.

Must possess a Bachelor's degree in Management Information Systems, Business, Computer Science or a related field and relevant experience, including college course/project work and/or work experience with PowerBuilder, Enterprise Java Bean, C# and Delphi.

Resume and/or cover letter must reflect each requirement above and specify reference code AD-GCD/GC0804 or it will be rejected. Forward resume to BI Staffing Center, PO Box 534, Waltham, MA 02454. Fax number: (781) 663-2431. Email: [BIPI@BI-careers.com](mailto:BIPI@BI-careers.com). EOE.

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Design info. systems to provide data from computer storage; design methods for collecting & classifying info. for input/output retrieval using symbolic language & optical/pattern recognition; manage life-cycle of Marine Inventory Mgmt. & marketing platform; create graphic yacht presentations in qualifying process of MIMM platform; create web sites using HTML, Macromedia Flash, Dreamweaver, Adobe Photoshop, Image ready/styler; create CD/DVD based marketing promos incl. flash imbedded video & interactive digital manuals. Req. 5 yrs. exp. Resume to HR, TAAS Enterprises 14202 Belmont Trace Wellington, FL 33414. No calls.

#### NOTICE OF VACANCY #2005-4

Network Applications Analyst, (Non-Classified Position): DUTIES AND RESPONSIBILITIES: The Network Applications Analyst will be responsible for Implementing Web, Internet, Local Area Network (LAN) and Wide Area Network (WAN), connectivity. Will be involved in network programming, installation, operation, maintenance, administration, and performance testing of University Internet and intranet. Will develop networking and data communications strategies. Will implement security and disaster recovery solutions for University network. SALARY: Commensurate with experience and education. QUALIFICATIONS: Bachelor of Science degree in Computer Science or related field with 3 years of experience. EFFECTIVE DATE: Upon approval. TO APPLY: Send letter of interest and résumé to: Human Resources, Fairmont State, 1201 Locust Ave., Fairmont, WV 26554-2470. DEADLINE: For full consideration, résumés should be received by October 8, 2004. The position will remain open until filled. FAIRMONT STATE IS AN AFFIRMATIVE ACTION, EQUAL OPPORTUNITY INSTITUTION. INDIVIDUALS FROM TRADITIONALLY UNDER REPRESENTED GROUPS ARE ENCOURAGED TO APPLY.

**Software Engineer - various locations (2 positions) - Research, design and develop computer software systems in conjunction with hardware product development applying principles and techniques of computer science, engineering and mathematical analysis.** Requires Master or equivalent in Computer Science, Engineering or Mathematics. Equivalent is Bachelors plus 5 yrs exp. Requires 3-5 yrs exp in the job offered. Three yrs exp if Masters or 5 yrs exp if Bachelors. Must have 1-yr exp using Oracle and SQL. 5 day, 40 hr/wk, \$77,542/yr. Please mail resumes to Workforce Development Programs, PO Box 46547, Denver, CO 80202 and refer to order number CO5093902.

**Programmers (Level-3): Develop & write computer programs for web/client-server software apps. & convert project specs. in JD Edwards One World, Microsoft tech., Oracle and Java/J2EE. BS in Comp. Sc., or rel. field & 2 yrs. software development exp. including at least 12 months exp. in job offered required. \$50,200/Yr. & benefits. Mail resume to Jann Nielsen, Melaleuca, Inc., 3910 S. Yellowstone Hwy., Idaho Falls, ID 83402. No phone calls please. EOE.**

Mphasis Corporation has multiple openings for the following positions at its offices in New York, NY, Memphis, TN, Houston, TX, San Mateo, CA and unanticipated client sites throughout the U.S.: Programmer Analyst, System Analyst, Software Engineer, Project Manager, Management Analyst, Sales Engineer, Business Development Manager, Finance Manager. Please send resume, salary history and position applied for to 460 Park Avenue South, Suite #1101, New York, NY 10016, Attn: H.R. Manager.

#### NET MATRIX SOLUTIONS

Net matrix Solutions has the following positions open:

**SOFTWARE ENGINEERS:** to research, design, develop computer software systems and lead new product development projects to timely completion. Ability to evaluate and design SAP software is required. Needs a Masters in CS/MIS or any related degree combined with 1 + years experience or Bachelors with 5 years experience in designing and developing computer software systems.

**SYSTEMS ANALYSTS:** to analyze, design and develop operational procedures to automate processing and to develop new systems to improve production. Knowledge of SAP, Oracle, and other business related software is essential. Needs Bachelors in Engineering/CS or in any related field combined with 5 years relevant experience in designing and developing computer software systems.

Please send resumes to: Human Resources, 480 Congress Street, 1st floor, Suite #317, Portland, ME 04101.

**Programmer Analyst - Microsoft & ERP Engineer:** Wanted by an IT consulting firm in Keene, NH to work at various client locations throughout USA. Respond to HRD, Infowave Systems, 39 Central Square, Suite #201A, Keene, NH-03431. Requires: Bachelor Degree in Computer Science or related field and one year experience. In the alternative will accept applicants with three years of university level education plus three years of experience performing analysis, development and testing of enterprise web applications. Primary experience must incl working with technologies such as Erwin, ERP Great Plains, Dextenty, C#, ASP.net, VB.net, MTS, RDBMS tuning on SQL Server /Oracle 8.x/8i on .Net Framework, Windows and UNIX. Other skills preferred shell, scripting languages, MTS, other ERPs.

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**Senior Project Mgr:** Direct offshore software eng. teams (20+) in dev. of software app. projects. Manage software design and dev. for final delivery & QA. Plan & monitor project implement., resources & assignmnts. Provide tech. guidance. Freq't overseas travel req. & relocation to sites in the U.S. Must have MS in CS or Comp-Aided design or equiv; 3 yrs exp in proj.mgmt of software dev incl. 1 yr mgmt of offshore software dev teams according to CMM 3 processes and 1 yr exp in Lotus Notes, J2EE, Conf. mgmt, CORBA, Unix, Windows, Solaris, embedded programming. Job Location: Bellevue, WA. Salary: \$113+K/yr Send resume to Job # ANLC04 IBS Capital Main Office 136 Summit Ave. 2nd Fl. Montvale, NJ 07645

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Bayou Healthcare LLC (dba CrossRoads Regional Hospital) is looking for system analysts or software engineers to handle our IT projects. We offer competitive wage. Interested applicants must have Bachelor or Master degree with IT experience. Please mail resumes to 644 High Plains Ave. Baton Rouge, LA 70810. EOE.

Chad Oils, Inc. seeks an experienced Programmer/Business Analyst with 5 yrs. experience in Systems Programming and VB, Oracle and SQL server. Mail resume to Attn. Chad, 600 Parsons Street, Pine Bluffs, WY 82082.

Embedded Software Eng. wanted by company engaged in graphics and multimedia technology design, manufacturing and marketing. Requires Bach. in CS or EE plus 2 yrs exp. including Set Top Box methodologies and ATSC. Reply to ATI Research, Inc. H.R. Dept., Attn: K.B., 62 Forest Street, Marlborough, MA 01752.

Programmer: Web app. Development including database, business object and presentation layer design and programming. Maintain web apps. used in Judicial Agencies. Position requires developing dynamic government/commercial web sites using C#, ASP.Net, XML, SQL, and migrating existing ASP sites into ASP.Net. Req. BS or foreign equivalent in CS. Must be proficient in ASP.NET, C#, XML, SQL, and JavaScript. 40 hr/wk, 9-5. Send resume to Advanced Computer Technologies at 600 South Court St, Suite #215, Montgomery, AL 36104.

## SYSTEMS ANALYST

Analyzes user requirements, procedures and problems to automate processing or to improve existing computer systems. Bachelor's Degree and 2 yrs. exp. required in job offered. Must be able to travel. Incl. in the 2 yrs. must have 2 yrs. exp. with various computer skill sets such as OOP/OOD with J2EE, Struts, design patterns, EJB2, JNDI, JMS, JDBC, JNI, JavaScript, Eclipse, XML, UML, XSLT, SMTP, MQ Series, Apache, Websphere Studio, WSAD, WebLogic, UDB, TERADATA, Oracle, SQL Server, DB2, JUnit, JProbe, Webload, TOAD, ERWIN, Informatica, UNIX & MS Windows. 40 Hrs./wk. 9 to 5, Monday thru Friday; no overtime. Apply by resume to Nagesh Ganta, HR Manager, Capricorn Systems, Inc. 3569 Habersham-at-Northlake, Building K, Tucker, GA 30084.

Senior Enterprise Infrastructure Engineer wanted to participate in arch. designs for the planning, integration & development of J2EE applications. Must have Master's deg. in Comp. Sci. or Eng. & 2 yrs. software development & object oriented analysis & design exper., incl. commercial software eng. exper. in EJB, SOAP, Weblogic & WSAD, exper. in Content Mngmt. or Digital Asset Mngmt. Systems, & exper. in a tech. leadership role, responsible for design & development of core functional modules of J2EE based application. (A Bach. deg. & 5 yrs. exper. can substitute for a Master's & 2 yrs. exper.) Send resume to Human Resources, Job Code SE89, Context Media, Inc., 1 Providence Washington Plaza, Providence, RI 02903.

DATABASE ADMINISTRATOR wanted by Int'l freight forwarders/logistics co. in Houston, TX. Must have B.B.A. in MIS or CIS plus exp. Respond by resume only to: Alice Darragh, General Manager, H/C-#10, FTS International Express, Inc., 480 North Sam Houston Parkway East, Ste. 223, Houston, TX 77060.

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Livermore Software Technology Corp (LSTC), owner of LS-Dyna, LS-PrePost, LS-Opt, is expanding worldwide & seeks software developers in area of multimerial Eulerian fluids. Min. qualification is BS/MS with 1-5 yr. exp. Please mail resumes to 7374 Las Positas Road Livermore, CA 94550. EOE.

Software Engineers needed. Seeking qual. candidates possessing BS or equiv. &/or rel. work exp. Part of req. rel. work exp. must include 3 years working w/ASP, ASP.Net & C#. Duties include analyze, design, develop & maintain existing & proposed apps./systems using ASP.Net, VB.Net, C#, MS SQL Server, Oracle & ASP. Responsible for successful design, development & implementation of apps./systems at various client sites. Fwd. resume, ref. & salary req. to Computer Consulting Associates International, Attn: HR, 200 Pequot Ave., Southport, CT 06890.

## Senior Consultant

(Glen Mills, PA and other locations throughout the United States). Work on Oracle projects involving functional and technical implementations utilizing the industry standard Oracle development methodologies, such as AIM and CDM. Lead and manage functional implementation in Oracle CRM, Mobile and Wireless Applications as it relates to business requirements analysis, design of best in practice industry solutions, configuration, testing and delivery of Oracle Applications. Utilize Oracle Technology to perform Oracle Mobile and Wireless Implementation, Wireless Applications Architecture, and Oracle Data Warehousing Design and Development. Lead and manage technical development of RICE components (custom Oracle Reports, Inbound and Outbound Interfaces, legacy system data conversion, custom workflows and custom extensions across Supply Chain, CRM, Financials and HR modules). Utilize Oracle Development Tools such as PL/SQL, Oracle Forms, Oracle Reports for RICE components and customizations. Work with Java, JSP's, Servlets, BC4J to extend or customize the self service modules in Oracle applications. Engage in upgrades, setup, & system administration of Oracle Applications 11i instances & Oracle 9i, 8i databases on UNIX/NT platforms utilizing Oracle Applications Architecture. Work on middle tier, Oracle 9ias application server administration, configuration, and architecture. Work with integration tools like Informatica, Taviz and Kintana on multiple Oracle client engagements. Plan and lead the team structure, strategy, delivery process for Deloitte Oracle Extended Delivery model.

The wage offered is \$78,764/year. The work schedule is Monday-Friday 9:00am-5:00pm. The minimum requirements are as follows: Master's degree in Information Systems, Computer Science, or Engineering (any) + 2 years experience in the job offered or 2 years experience as a Business Analyst, Associate Consultant, Consultant, Senior Consultant, or Applications Developer. Related experience must include at least 2 years of Oracle Development Tools; Oracle Development Methodologies; Oracle 9ias Application Server Administration, Configuration and Architecture; and Oracle Technology.

Please send your resume, referencing Job Order Number **WEB 464617** to the: PA CareerLink, 701 Crosby Street, Suite B, Chester, PA 19013-6096. EOE.

IT consulting firm located in Vermont has multiple openings for IT professionals to serve multiple clients throughout the U.S. Job duties include: Analysis, design, development and testing of computer applications. Specific skill sets needed include:

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- ERP Consultants - Oracle/PeopleSoft/SAP

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F/T Research Software Engineer for NM location. Responsible for performing database design, system configuration, data conversion planning, application design and development, documentation development, and application and system training. Configure hardware, software, and network components of GIS and LIDAR systems. Assist clients in developing practical programs that maximize the benefits of their GIS investment. Analyze clients' system operations to determine opportunities for increasing production efficiency. Must have a Master's degree Computer Science, related field, or foreign degree equivalent. Must have 2 yrs. of exp. in job offered or a position w/ same duties. Salary: Competitive. Send resumes to: Sheila Seals, Spectrum Mapping, LLC, Ref: 222, 28969 Information Lane, Easton, MD 21601.

## Systems/Programmer Analyst

(For Dayton, OH and Chicago, IL): Multiple openings. Will be resp. for complete life cycle of software applications using C, C++, Java, PL/SQL, Oracle, DB2, SQL Server, Sybase, Oracle Express, Financial Analyzer, Warehouse Builder, Informatica, ETL, Business Objects, Java Script, XML/XSL, .NET, ASP, Lotus Notes, Weblogic and Data Warehousing tools on Windows and UNIX platforms. Masters with 3 months or Bachelors with 2 years exp. w/proven expertise on above tools and technologies required. Competitive salary. 40 hrs/week, Mon-Fri, 8am to 5pm. Job requires travel to client sites within U.S. Must have legal auth. to work in U.S. Submit two sets of resumes w/cover to: HR Mgr, Paramount Global Solutions Inc, 1458 Yankee Park PL, Dayton, OH-45458 or to: 2520 S King Dr Suite 505, Chicago IL 60616.

Software Engineer: B.S. in Comp Sci., Eng. or related field + 4 yrs. exp in Tandem COBOL, Tandem C, Pathway & Enscribe; 1 yr. exp in MQ Series, TPF, Visual Basic & ASP Reply to American Computer Services, 2183 86th St, Ste B, Des Moines, IA 50325. EOE.

Lead Java Developers needed. Seeking qual. candidates possessing MS or equiv. &/or rel. work exp. Part of req. rel. work exp. must include 3 years working with Java, Rational Rose, & either Servlets or XML. Duties include: design, document & maintain Java-based web applications; develop back-end code using Servlets & JSP; work with Oracle, XML, Rational Rose & HTML. Fwd. resume & ref. & salary req. to Petris Technology, Attn: HR, 1900 St. James, #700, Houston, TX 77056.

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## Multicore

chip. In contrast, Oracle and IBM DB2 users would have to purchase a license for each processor core in a system.

Nine of 12 corporate users contacted by *Computerworld* — all with mixed database environments — praised Microsoft's multicore licensing policy. Three said it reaffirmed their decisions to focus on SQL Server. One said the policy might have priced Oracle out of the market. But six said they don't think it will affect their purchasing decisions.

"That decision is driven by the application selected, which is based on business needs," said Randy Truax, a technical services manager at Metropolitan Health Corp. in Grand Rapids, Mich. Truax said the health care provider has no plans to use servers with multicore processors. He also expressed skepticism that Microsoft will stick to its policy over the long term.

"It would not surprise me to see the future versions of products like SQL Server rise in cost to account for lost revenue streams on multiprocessor units," Truax said. "The cold, hard reality is Microsoft, just like Oracle, is going to charge as much as the market will take to make their stockholders happy."

### Choosing the Right Tool

Keith Nielsen, a West Valley, Utah-based consultant at Discover Financial Services Inc., said that he thinks Microsoft's licensing policy may sway some small companies but added that he can't foresee large corporations making a switch from their existing technology. He noted that Discover Financial is an IBM shop.

"We prefer to choose the right tool for the job, not the cheapest," said David Curran, manager of IT at CE Franklin Ltd. The Calgary, Alberta-

## Licensing Status

The server software that Microsoft licenses on a per-processor basis includes the following products:

- BizTalk Server
- Commerce Server
- Content Management Server
- Host Integration Server
- Identity Integration Server
- Internet Security and Acceleration Server
- SQL Server
- Speech Server

based supplier of oil and gas exploration and production equipment uses both SQL Server and DB2. In fact, the company already uses multicore processors in an IBM i5 server, which runs its PeopleSoft EnterpriseOne ERP system on DB2, Curran said.

But no matter what users say now, they will eventually have to consider the different cost models once the adoption of servers with multicore processors grows, predicted Julie Giera, an analyst at

Forrester Research Inc.

Giera also said she expects that Oracle and IBM will see pushback from their customers — particularly if users don't get double the computing capacity with dual-core processors. But Giera said it will be difficult for IBM and Oracle to react to Microsoft in the short term because they have just asserted their own licensing stances.

IBM and Oracle executives were unavailable for comment on Microsoft's decision. But officials from both companies said last month that they consider each processor core on a chip to be a CPU [QuickLink 49648].

Corey Thomas, a senior product manager for SQL Server, said Microsoft examines the licensing policies of its competitors as part of any analysis. But he said the decision on multicore licensing was primarily based on customer feedback.

The Standard Edition of SQL Server sells for \$4,999 per processor and supports up to four processors, whether they're multicore or not. The

Enterprise Edition is priced at \$19,999 per processor. With multicore processors, users could "get more processing power out of the Standard Edition" without paying a higher software license fee, said Cori Hartje, director of marketing at Microsoft's worldwide licensing and pricing group.

IBM and Sun Microsystems Inc. have already developed dual-core processors for some of their servers. Intel Corp. and Advanced Micro Devices Inc. both plan to deliver dual-core x86 devices next year and add chips with more processor cores at a later date.

A database services manager at a Dallas-based cosmetics manufacturer said he was relieved to hear that Microsoft won't charge users for each processor core. "Dual-core puts two slower, lower-heat-producing chips onto a single

processor. We're not going to get twice the work done when the two cores are slower. So why should we have to pay twice the price?" he said.

**The cold, hard reality is Microsoft, just like Oracle, is going to charge as much as the market will take.**

**RANDY TRUAX,**  
TECHNICAL SERVICES MANAGER,  
METROPOLITAN HEALTH CORP.

Microsoft's decision was "right on the money," said Jim Prevo, CIO at Green Mountain Coffee Roasters Inc. in Waterbury, Vt. Vendors that interpret the addition of multicore processors as something other than a chip-level performance

boost "are hoping to deny their customers the advantages of increasing systems performance and line their own pockets with short-term profits," Prevo said. **Q 50264**

## MORE MULTICORE NEWS

For an in-depth look at emerging dual-core chip technologies, turn to page 40.

Online: Intel says it doesn't plan to ship its first dual-core Xeon processors until 2006:

**QuickLink a5110**  
[www.computerworld.com](http://www.computerworld.com)

## Release of SQL Server 2005 May Slip Again

MICROSOFT last week confirmed that the shipment date for its long-awaited SQL Server 2005 database could slip slightly beyond the target of the first half of 2005 that the company set earlier this year when it delayed the upgrade for the third time.

In a product update sent to beta testers via e-mail on Oct. 15, Paul Flessner, senior vice president of server applications at Microsoft, said that the third beta release of SQL Server 2005 remains on track for the first quarter of next year and that the commercial release is expected during the summer.

"We decided summer was a more general and accurate representation than committing that

[the final release] is going to be by June 30 no matter what," said Kirsten Ward, lead product manager for SQL Server.

Microsoft's Visual Studio 2005 development tools will ship with SQL Server, so they're also now due in the summer, confirmed Prashant Sridharan, a lead product manager.

Microsoft could meet its first-half shipment goals if SQL Server 2005 ships in June, but that appears unlikely based on the expected release date for the product's third and final beta. Ward said four to six months typically elapse between the shipment of a final beta and the product's release to manufacturing.

But Flessner cautioned that the

delivery date will depend on many factors, including user and partner feedback as well as successful customer deployments and internal installations by Microsoft's IT department. He noted that Microsoft already has 20 applications in production on the current beta release, including its full SAP-based ERP system and its payroll and document repository systems. The company plans to put an additional 30 applications into production before the product's commercial release, Flessner said.

Prior to the release of the third beta, Microsoft plans to make available interim builds of SQL Server 2005, known as Community Technical Preview editions, in order to collect additional feed-

back. A developer edition of the first CTP is being made available to MSDN Universal, Enterprise and Professional subscribers, as well as participants in Microsoft's Technology Adoption Program.

In March, Microsoft pushed back the release date of SQL Server 2005, code-named Yukon, from the end of this year to the first half of 2005 [QuickLink 45400]. The original projected ship date for the product had been late 2003.

In a July interview, Flessner attributed the delay to the depth of the integration between SQL Server 2005 and Visual Studio 2005. He pledged then that the company would deliver "more regular releases" of the database in the future.

— Carol Sliwa





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FRANK HAYES ■ FRANKLY SPEAKING

# Scary Monsters

**H**ALLOWEEN IS ALMOST HERE. Costumed figures will soon be lining up at your front door to yell, "Trick or treat!" You'll see Spider-Men in large numbers this year and, as usual, lots of princesses, ballerinas and angels. But you'll also see plenty of ghosts, vampires, mummies, skeletons and other monsters of every description.

You know how to deal with the monsters at your doorstep. You either buy them off with a handful of treats for each of them, or you turn off the porch lights and pretend they're not out there.

After all, you know there's nothing to fear from those pint-size creatures. The really scary monsters lurk around your IT shop.

You've heard about zombies, of course — those computers that have been taken over by intruders and turned into relay stations for viruses, worms and especially spam.

But zombies aren't the only kind of IT undead. There are also vampires that suck the life out of your resources and budget, such as those servers that are hardly ever used these days but still require maintenance, updates and patches.

And mummies, in the form of old bugs that you thought you had wrapped up and buried but return when a new patch or code change reverses your fix and resurrects the problem.

You probably have a Frankenstein monster or two around your operation: patchwork systems that were cobbled together in an emergency, never quite worked right and certainly won't ever scale.

Werewolves show up, too — hardware and software that seem to be fine but intermittently change into a beast and then, just as suddenly, return to normal.

You have skeletons, those projects that never got the funding they needed. They can't provide more than a tiny fraction of the functionality users really want, but no business sponsor will commit to fleshing them out.

And then there are ghosts, like that notorious project that failed spectacularly. Yes, it's dead — but it continues to haunt you every time it's mentioned, which often happens around the time you're trying to get the budget you need for another ambitious project.

The monsters aren't just in your systems, either. Almost every organization has its Jekyll and Hydes,

those business managers who tell you one thing about what's needed for new systems but tell users to expect something entirely different.

We've all seen Jack the Ripper — the budget-cutting CFO who really doesn't understand that not every new project is a boondoggle and that a staff or project can't accomplish anything if it's gutted.

And if your CFO isn't a Ripper, there's a good chance that he's a Grim Reaper whose budgetary touch brings death to good and bad projects alike.

You know the Invisible Man — he starts out as the business sponsor who champions a project, then disappears when it needs an investment of political support or time from his staff.

And there's always a King Kong, the executive who *will* get whatever he wants from IT, no matter what it costs — or how bad an idea it may be.

No wonder life in corporate IT sometimes feels like a horror show. It's not your imagination, and these creatures don't just come out once a year.

And unlike the make-believe monsters haunting your front door, you can't buy off your IT-related monsters with chocolate bars and hard candy. Forget the treats — you're stuck with their tricks.

You can't douse the porch lights and ignore them, either. Oh, maybe with hard work, discipline and diligence, you might be able to put a stake through the heart of a few of your monsters.

But for the rest, you'll just have to live in IT's Halloween world — all year long. **50227**



**FRANK HAYES**, *Computerworld's* senior news columnist, has covered IT for more than 20 years. Contact him at [frank\\_hayes@computerworld.com](mailto:frank_hayes@computerworld.com).

## Dawn of the Dead . . . line

The IT pilot fish is called on to fix everything in this office, from the microwave to the fire alarm. So when the fax machine starts sending faxes with big black streaks, fish installs a new machine. But the same problem returns immediately – and this time, fish notices it happens only late in the morning on some days. Then fish notices that the sun shines directly on the machine in the late morning. “I closed the blind,” says fish. “Problem solved.”

## The Exorcist

**Trash is piling up in this pilot fish's cube, so he asks facilities guy**

why. Turns out the non-English-speaking cleaning ladies won't go near that cubicle because a threatening, demonic voice comes out of it at odd times. That's when fish realizes his PC is on all night, and whenever e-mail arrives, a Klingon voice announces, "Captain! Incoming message!" "I changed my theme to something less vocal," says fish. "The facilities guy assured the janitorial staff that the cube had been depossessed, and my cube started getting cleaned again."

## Poltergeist

"My mouse is opening and closing programs on its own," user at a remote site tells help desk. Pilot fish tests the PC across the network and, sure enough, the pointer moves, though user swears she's not touching the mouse. Much troubleshooting later, fish hops a plane to the site. "I find that the two users in this office replaced their company-provided keyboards and mice with unapproved cordless setups," he

# SHARK TANK

sighs. "They were both set to the default frequency. A quick turn of

the frequency dial cleared up the problem."

Friday the  
... er, 31st

User complains she's having trouble entering a date in a database. Database support staff tries, but after the date is entered, he can't move the cursor out of the field. Frustrated, he asks a pilot fish to enter the date into the table manually. That's when fish explains why he won't. "The date they wanted to enter was June 31."

## Trick or Treat

When this user's PC suddenly starts making a loud, continuous sound, she calls support a lot faster. "I was initially thinking it was a thermal alarm, but the fans and temperature were fine," says fish. "But when I started the word processor, the cursor took over the screen, filling it with spaces." Under the space bar, fish finds a big chunk of candy bar. "Then I turned the keyboard over," he sighs. "and there was what looked like a candy bar out of it."





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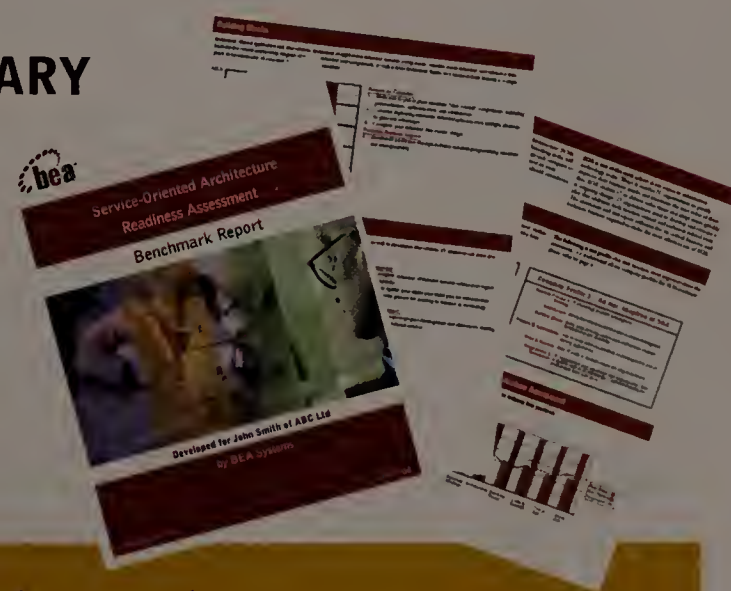
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